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MAY THE NATION'S CONSTRUCTIVE AND PRODUCTIVE STRENGTH DESTROY THE MENACE OF AUTOCRACY IN 1918?

NONE can definitely forecast the conditions that will prevail during the coming year. The rushing current of world events, pouring out from the seething caldron of war, is froth with complexities too vast for the intellect of the prognosticator.

We know that the crisis in the destiny of democratic nations has reached a crucial stage. The autocratic ideal of government with its hopes of world domination is striking desperately to achieve its designs. The far-flung battle lines are fluctuating between advance and retreat. Each is seeking to deliver a crushing and decisive blow in order to realize its objective and to hasten the advent of peace.

The entrance of the United States into the war was brought about, as we all know, by the continued impositions and unwarranted attacks upon our ships—attacks directed without regard for the sacred rights of human life and the principles of international justice. War was declared—not against the German people—but against the government that has imposed its iron will upon them for generations, and which is seeking to extend its tyranizing power to other domains.

As Americans, co-operating with our allies to maintain and perpetuate the ideals of democracy and to secure an enduring peace, it behooves us to fully appreciate the importance of winning the war.

That will be our most important business during 1918 and one which will easily overshadow all other activity. It will mean a business of intensive busyness in productive and constructive work at home, in order that our operations in Europe may prove a strong and determining factor in bringing the war to a swifter conclusion.

The return of normal business conditions is not within immediate view, and leading business men in the building trades and manufacturing lines are neither optimistic nor pessimistic, preferring to remain reserved and conservative in their expectations. They realize that in the building industry, as well as in any other, the law of supply and demand must ultimately control. This law cannot be set aside. Although war results in the upsetting of normal conditions, the law of supply and demand is still the governing power. The nature of the demand may change as it has changed since our entrance into the war, and naturally the supply will tend to follow the demand. The nature of the present building demand has changed, but the supply of buildings is far short of the number required to meet this changed demand. While residential construction is curtailed, factory buildings are needed in excess of the supply, and activity in this class of buildings is increasing despite high prices, labor scarcity, transportation difficulties and other factors.

High prices are not welcomed by those who have to pay them, but it is not well to consider their immediate and uncomfortable effects without due regard to the conditions which caused them. High prices, it is said, are a sign of scarcity, and the remedy for scarcity is declared, by some, to be increased production, which also creates an inducement to enlarge the facilities in productive activity.

It is not reasonable to expect the investor in residential building to build year after year at the same rate. It is the tendency with him to build when prices are low. Hence contractors will find it advantageous during 1918 to devote more of their efforts toward remodeling and repair activity in their communities rather than anticipate much new construction work.

CONSERVING *the* HEALTH *of* OUR TROOPS *in the* CANTONMENTS

How Uncle Sam Is Striving to Keep the Boys in Khaki in the Pink of Physical Trim. Sanitary Engineering a Factor in the Plan of Health Conservation

By Captain Paul R. Davison
United States Army.

Editor's Note:—The author of this article is a seasoned army officer of the regular army, who has assisted in the engineering side of barracks construction in the past and who is familiar with the sanitary necessities which must prevail in large camps. Captain Davison is one of the valued officers of the Central Department, stationed at Chicago.

Capt. Paul R. Davison.

SANITARY ENGINEERING has become a vital factor in the conservation of the health of troops. In the training of the new national army, this phase of engineering has been recognized in the construction of our numerous cantonments.

The war department has striven most conscientiously to provide adequate sanitary facilities in barracks housing.

The government has succeeded very largely in accomplishing its aim to keep well those who are well, for, in the construction of the cantonments, considerable stress has been laid upon the importance of desirable plumbing, heating and ventilating facilities.

It is obvious that these things have a decidedly direct relation to the maintenance and promotion of the soldier's health. The lack of such equipment would usher in no end of evil, resulting in the increase of preventable diseases and the accumulation of avoidable filth.

Fresh air in the sleeping quarters is the greatest preventive of disease propagation in the life of a soldier. Overcrowding of men in stuffy barracks endangers health and lowers vitality. The old saying, originating in civil war days, that disease kills more men than bullets, is, under such conditions, prone to become an actual fact.

An historical instance of the menace of foul air and insanitary conditions is recorded in the account of the plague that swept over London in 1665, which brought death to over 100,000 of the population, when the familiar cries of —'bring out your dead,' was the commands of the drivers of corpse-laden wagons. The great London fire of 1666, however, saved thousands of new victims from the ravages of the plague, for the city's insanitary sections were consumed in flames and a more sanitary London was reconstructed upon the ruins.

In actual warfare with its varied hardships it is difficult to provide desirable sanitary facilities for the men at the front. Dug-outs are only makeshifts at best, serving the exigencies of the hour, as it were. They are inadequately ventilated, and while their natural dampness can be somewhat modified, there is on the whole (as compared with modern barracks) no favorable analogy.

Recognizing the unsatisfactory aspect of life at the front, we must face the situation bravely, make the most of it, and endeavor to conserve health as best we can, remembering Sherman's remark apropos of the relationship of war and hell. If we cannot have the desired sanitary facilities in trench existence, we can at any rate, see to it that these are provided during the period of preparation and training for the hardships incident to warfare. If the health of our new national army has been well conserved, preparatory to going abroad, its resistance to disease will be greatly strengthened when the men reach the other side.

Thousands of feet of radiation have been installed in the cantonments, thus affording a uniform temperature for the troops during the winter nights. Natural ventilation of the most approved type has been provided. In the typical cantonment, separate buildings have been constructed for each company of men. Lavatory and complete toilet accommodations have been intalled, supplemented by shower baths. The waste and excreta are usually drained into the city sewers, if the cantonment is situated near a large city or town. Otherwise cesspools are used for their disposal, constructed a safe distance from the barracks. Concrete floors are laid in these buildings.

There is always a tendency towards criticism in any great construction or engineering enterprise, governmental or private. The technical critic intent upon finding at least minor inconsistencies in construction, can

usually, even under the most perfect supervision, discover something that he essays to criticise. The public, however, may rest assured that any criticism of the sanitary or structural features of U. S. cantonments is without substantial justification. The visitor to any of our training centers will find that Uncle Sam, while not infallible, has accomplished splendid results in cantonment building, results that are equal to if not superior to any similar project in any of the warring nations.

Bathing at least three times a week is the usual custom in the cantonments. Hot and cold water is supplied, permitting the bather to adjust the temperature of the water to suit his requiremens. The number of shower heads and wash basins, etc., per company, have been carefully figured by trained army engineers so that no overcrowding of the toilet building will occur. Cleanliness is recognized as a very important phase of army life, and while it may not promote godliness in any degree, it is assuredly related to Hygeia, the goddess of health.

Thus in the process of making fit these men, who will carry the flag of democracy into the shell-plowed fields of the Old World, Uncle Sam has spared neither brains nor money, in order to equip an army of men, physically hardened to endure the vicissitudes of battle on a foreign soil. That the science of sanitary engineering is playing a great part in this process of making men fit, there can be no question.

A Cantonment in Course of Construction, Showing Sewer and Water Piping before Installation. Note Intake for Ventilation over Doors.

The cantonments, now dotting the country from coast to coast, have all been designed along lines calculated to conserve the very best health interests of the men. The biggest of these cantonments is Camp Lewis, which occupies a military reservation of 70,000 acres, situated at American Lake, about eighteen miles east and south of Tacoma, in the state of Washington. This cantonment, which numbers 1,406 substantial frame buildings, was constructed within eight weeks at a total cost of practically five million dollars. The big project was completed as the result of good organization and hard work. The camp will accommodate in the neighborhood of 50,000 men.

Another interesting piece of engineering work in cantonment construction is to be found in an $8,000,000 training camp in one of the eastern states. Eight hundred and forty-two buildings have been erected, and all are equipped with light, water, sewerage systems, etc. Twenty-three miles of sewer system are installed. The officers' quarters comprise seventy-six buildings, each building having an officers' lavatory near at hand. In the company and detachment barracks there are two hundred and twenty-one buildings with a company lavatory building attached to each. Fourteen individual heating plants have been constructed to furnish steam heat to the different buildings. Approximately two million gallons of water are required daily for the use of the camp. The water is pumped from a huge artesian well, being pumped over two miles to the stand pipe tanks, of which there are four. The total capacity of each tank is 400,000 gallons and each tank is filled in sixty-seven minutes. Up-to-date, over 500,000 square feet of radiation have been installed in the cantonment. When this training camp is completed, which it will be soon, it will contain about 1,365 buildings of all kinds.

There will be sixty hospital units in the camp, all thoroughly equipped to take care of patients. An interesting point about this camp is its refrigerating plant which has a production capacity averaging twenty tons of ice each twenty-four hours. The plant comprises one butter and egg cooler, approximately 9,180 cubic feet; one provision cooler, about 10,800 cubic feet; one ice storage room, about 3,780 cubic feet, and one beef cooler with overhead track with capacity for storage of 120 cattle.

A modern plumbing system has been installed in this cantonment and much effort has been expended to render the system thoroughly sanitary and in conformity with the best plumbing practice. Opportunities for cleanliness have been amply provided, there being over 2,200 shower baths installed. This sanitary convenience is an important part of the soldier's life, tending to harden and invigorate him for the day's duties.

The extraordinary speed and efficiency shown in the erection of the numerous cantonments is but an integral part of that greater, vaster efficiency movement which is co-ordinating the industries of the nation—to the end that America may conserve her energies and resources, and be fully prepared to deliver a stupendous blow at the very heart of Prussian militarism. The predominating factor or thing which characterizes our entry into the war is optimism. We have never known defeat at the hands of any nation. Our record is one of persistence, valor and triumph. We propose to stand by and live up to that record in the present conflict, feeling confident that our cause is a just and righteous one, which concerns the democracies of the world as well as ourselves. We are not awed nor cowed by the enterprise and militancy of the enemy. We are confident as citizens and as soldiers, that the reputation of our forefathers in wars of the past will be upheld, and that we will stick to our task with a mightier and greater courage than we or the world have yet seen.

The youth of America, those who have been called to the colors, will therefore emerge from their season of preparation full of that physical and mental vigor that goes into the making of the man and the soldier.

They will possess that poise, brain and reserve energy, which will be instrumental, in co-operation with our allies, in smashing the hydra-headed monster of Kaiserdom, which for generations has menaced the peace and democracy of the world.

No enduring peace can be assured until civilization is freed of this menace, which, if permitted to survive, would again seek to repeat its sanguinary record.

A MERRY CHRISTMAS *to* ORDER

The Story of How an Old Difficulty Was Handled in a New Way

By B. C. Bean

Written for "Domestic Engineering."

I.

"LET'S SEE," observed John Burke, the president and principal stockholder of Burke and Co., Plumbers and Steamfitters, "you've had four years study of—what you call it?—sanitary engineering in the State University, haven't you? And that's just four years more—"

"Yes, Dad, I know that story by heart," interrupted the son, an upstanding lad of twenty or so, as he smiled at his father, a smile in marked contrast to the older man's serious air. "Why!" I've bragged to the fellows at school until they know your history by heart. How you started to learn the business at ten; was a master workman a few years later and founded this business at an age when the ordinary lad is just beginning to think about having his nails manicured.

"They know, too, how many thousand dollars of business Burke & Co. do a year, and how John Burke, President, is the whole thing—lands the jobs; sees they're done, and makes the money come in on schedule for 'em. But there's one thing, Dad, I never told the fellows—one thing I've never spoken of, even to you, and that is that the business is getting a little too big for old ideas; that things are changing so rapidly in business now that the Burke and Co. policies ought to change to conform What do you think?"

"Think!" gasped Burke, the elder. "Think! why, if I've spent several thousand dollars making an anarchist out of you—if you've come back from school thinking you're father doesn't know how to run his business, why you'd better figure on starting out for yourself and see where you land.

"Say, Davis," he called to the bookkeeper, "What do *you* think! My son here has finished school and has come back with the idea that we're getting to be back numbers—that things are moving a little too fast for us to keep up with the procession. Where do you suppose a son of mine gets such stuff as that?"

Davis, thus appealed to, cast a critical eye on both father and son before speaking. Then he finally said, "Well, if I'm to referee this matter, I'd say, first of all, that Jack here is either right or wrong. That's a safe statement, isn't it?"

Burke the elder, grunted an assent.

"Then, if that's so," continued the bookkeeper, "ther's no particular cause for worry. If what you son says is so, and he can prove it to us, he ought to be thanked for advising us. If it isn't so, it will be good training for him to learn why it's not so, and why he was ever so foolish as to be so misled."

Burke listened, but still looked expectant. Encouraged, Davis proceeded: "So all there is to do is to prove or disprove the truth of what your son says."

Burke ruminated. Then his frown relaxed. "Say!" he exclaimed, almost jovially, "I don't know but what you're right. You take this young chap in hand, give him all the information about the business he needs and then tell him to come to me in thirty days with any proof that he can show me anything about the plumbing and steam heating business, why I'll make him a present of a block of stock. Thirty days will make it about holiday time—say we have this little matter mature December 25th."

II.

Davis found he had his work cut out for him, as a result of the suggestion he had so readily made. He was a competent accountant, though having little time for what he called "fuss and foolishness" bookkeeping. When young Burke, therefore, began probing beyond the figures and asking definitely what the figures stood for and how they affected the customer, sometimes Davis could answer him. More often not.

The young man, Davis soon noted, was particularly interested in determining where business came from and whether or not a given job led to others. To Davis a job was a job and if it paid a profit, there was an end to it. Very shortly young Burke had a considerable array of figures, together with a number of charts showing the sources of business and what class of work was paying the best profits and developing the most rapidly.

"It seems to me," said the young man, "that in a city of this size that we should get more big apartment house jobs. There are a lot of new apartment houses building, yet we seem to have gotten only one or two contracts."

Davis considered for awhile before answering. Then he remembered that the boss had said to give the young man all the information necessary. Then he admitted reluctantly: "Well, there is no doubt we'd get a great deal more of that business if it wasn't that Colonel Carter keeps so busy advertising his point of view that the work we did for him on his Homecrest Apartments is unsatisfactory."

"What's that?" asked young Burke with interest. "I hadn't heard anything about that."

"Why, you see," said the bookkeeper, apologetically, "Colonel Carter doesn't know anything about either building or steam heating and plumbing. He had some money left him and decided to put up a modern apartment building. We had the contract for plumbing and steam fitting. When the building was finished late last fall and the tenants began to move in, there was a big kick because the place couldn't be kept warm enough and because there wasn't boiling water on tap every hour of the day. You see, a lot of city people came to town and moved into those apartments and they just naturally wanted everything up to city conditions. So we have had nothing but trouble ever since."

"I should think that if our work was not all right that we could very quickly make it all right."

"So we could, but the Colonel and your father had some words and he won't let a workman of ours on the place. Says he'll have it out with us in court and make us pay for all the loss he has had from his vacant apartments. Meanwhile, several other big jobs have come on, and some of our competitors, by hook or crook, have landed the contracts."

"Then that's one place where a big job of work didn't land us any more business, isn't it?"

"I'm afraid so. And the job is well done, too. I never could understand it, but then it really wasn't any of my affair so I never pried into the matter."

The Colonel arose in all his Majesty and addressed the Court: "I am quite aware that the simple Announcement that our Side refused to prosecute this Case might work a Hardship upon my respected and honorable Opponent."

"Well, anyhow that calls for a special chart or diagram or something," said the young man, as he began studying the piles of papers having to do with the Carter job.

A few days after, young Burke presented himself in his father's office. "Well, I have enough data to work on," he advised. "Once I have some of this information worked up and put in graphic shape, I feel sure that you will admit I know something about the plumbing and steam fitting business."

The elder Burke glanced at the roll of papers that his son was carrying. Then he growled: "How much will you need for your fooling around with charts and things?"

The young man grinned at his father's willing acceptance that his experiment was, as a matter of course, to be paid out of the funds of Burke & Co. Then he said: "I think, Dad, you'd better start to considering me as an asset rather than a liability—at least until you have to make over that block of stock to me."

III.

Colonel Carter looked about him with an air of pleasure that was quite unlike his usual morning attitude. Despite the fact that a blizzard was howling outside, there was an air of cheer and comfort in the dining room. As he ate and drank, he seemed puzzled to account for his good nature.

"There seems to be something different this morning," he finally ventured to his daughter, who after the customary, "Good Morning," had waited her father's further remarks.

"Yes, father," she replied, "things seem to be different around the place somehow. When I got up this morning I noticed that everything was warm and cozy. It's the first time since we moved in here that the place has actually been warm."

"That's what's different, then?" demanded the Colonel. "I was fairly prepared to get up and dress in an ice box as usual, particularly when I saw it was storming. I wonder what's happened? It can't be, can it, that this is one of these warm storms that I have heard these Northerners tell about? If it is, it's the first story I ever heard a Yankee tell that came anywhere near being the truth."

When breakfast was over, the Colonel made his customary trip through the apartments to see how things were going. To his surprise, the tenants of the three

(Continued on Page 485.)

VOLCANIC STEAM USED *for* OPERATING HEATING AND POWER PLANTS *in* ITALY*

Extensive Possibilities of Utilizing Volcanic Heat for Industrial Purposes Shown in Success Attained in Italian Achievement at Tuscany. Many Areas in United States Where Boring of Over 5,000 Feet Would Supply Natural Heat for Community Use

IN Central Tuscany, there is a region in which powerful jets of very hot steam issue from numerous cracks in the ground, spouting high into the air, and bringing up boric acid and other minerals and gases, which are reclaimed by the chemical plants in this district.

Until recently, the steam has been allowed to go to waste, except when used for domestic heating, but since 1903, Prince Ginori-Conti, president of the "Societa Boracifera di Lardarello," has been endeavoring to use these steam jets or soffioni as a source of power.

His first efforts were attended with moderate success, but when he drilled down through a hard stratum of rock, 300 to 500 feet below the surface, to the very source of the steam he was able to get an ample and constant supply. His bore holes were from 12 to 20 inches in diameter and were lined with iron pipe. They afforded an abundant supply of steam with a pressure of from two to three atmospheres, exceptionally rising to five atmospheres, and varying in temperature from 150 degrees C. (302 degrees F.) to 100 degrees C. (212 degrees F.). There is no lack of supply if the bores are not located nearer than fifty feet from each other, and each can supply from 15,000 kilograms (33,000 pounds) to 25,000 kilograms (55,000 pounds) of steam at a temperature of at least 150 degrees C.

In 1906, this volcanic steam was first used in an ordinary steam engine of about forty horsepower, but the borax salts and other accompanying chemicals seriously corroded the machinery and interfered with constant and economic operation. Then the superheated steam was applied not directly to the engine, but to an ordinary multitubular boiler in which it was used in place of fuel to raise steam from ordinary water. Steam thus produced at a pressure of two atmospheres was passed through a superheater and then used in a 300-horsepower condensing steam turbine, directly connected to a three-phase electric generator. This experimental plant worked successfully, supplying power to the works and the villages around Lardarello.

After the outbreak of the war its success led Prince Ginori-Conti to develop another plant on a large scale, and accordingly three 3,000-kilowatt turbogenerators, working with a superheated steam at one and one-half atmosphere pressure, raised in specially designed and constructed multitubular boilers, were installed in 1916. The natural steam from the soffioni after heating the boilers is then utilized in the borax industries, so that the process is distinctly efficient.

The three-phase current is generated at 4,500 volts and is stepped up to 36,000 volts and transmitted along aerial conductors to Florence, Leghorn, Volterra, and other towns in Tuscany. In day time the power is used extensively in munition works and industrial establishments generally, and at night partly for lighting. The new undertaking has proved a great boon in industrial Tuscany, where the present war price of coal ranges from $40 to $50 per ton, and as the region of soffioni extends for many square miles around Lardarello, this harnessing volcanic heat to an electric power house or central station makes possible the increase of available power to hundreds of thousands of horsepower at comparatively small expense and without recourse to foreign resources. Extensions are now under way increasing the output to 40,000 kilowatts. A similar utilization of volcanic heat is contemplated near Naples, where the ground at depths of 100 feet is almost red hot.

Such utilization of the internal heat of the earth, however, is dependent upon exceptional physical conditions, and it has occurred to an American engineer, Nathaniel B. Wales, that these conditions could be produced artificially. The increase in temperature of the earth's strata in proportion to its depth shows a mean average for the entire earth surface of one degree Fahrenheit for every 55 feet of depth. There are many regions, however, where this increase in temperature is far exceeded. Hundreds of areas are to be found in the United States where the temperature rises one degree for every 20 or 25 feet of depth. There is a locality near Boise, Idaho, where three wells driven to only 400 feet yield 800,000 gallons of water daily at a temperature of 170 degrees.

It is Mr. Wales' plan to sink a well casing wherever the geothermic conditions are favorable until a stratum of high temperature, say 350 to 450 degrees Fahrenheit or higher is penetrated. Surrounding this shaft, a number of other casings would be sunk. Water would be injected into the heated stratum through the central well casing and the head of the water would cause it to percolate through the surrounding strata from which it would absorb heat and be converted into steam. The steam then would rise through the circle of well casings surrounding the central water shaft, and could be employed for power or heat. In this way, a large zone

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embracing several acres, could be utilized to form the active heating surface, drawing heat through the contiguous rock from an enormous radiant rock contact and allowing an inflow of heat from millions of tons of the earth's mass. The permanence of such an evaporative surface is amply proved by the maintenance of hot artesian wells, which are to be found throughout the world.

centers as well as in many mining centers, it would be far more economical to sink casings for subterranean steam generators than to be consuming coal continually and transporting the fuel hundreds of miles.

In California for instance there are to be found numerous mounds near the Salton Sea, adjacent to the Mexican border, which are in a state of continual eruption. In reality these are baby volcanoes which, like warts on a

A Plan for Utilizing the Internal Heat of the Earth for the Generation of Steam for Heating and Power.

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There are many areas in this country where borings not over 5,000 feet would give the necessary temperature and others of 1,500 feet or less would supply all the heat required. In some places the steam generated might have to be used indirectly because of the earth's salts held in suspension; but no doubt, these salts could very profitably be recovered and would add to the value of the installation.

The cost of maintaining a geothermic plant would be practically nothing. There would be only the first cost to consider—that of driving the wells and installing the engines and generators. Certainly in many power

cucumber, prominently dot the earth's surface at the southern end of the lake. They vary in height, ranging from one to ten feet, and in formation may be likened to the Vesuvius crater, throwing out gases, steam and all. From the lip of the crater a brown sulphuric slime runs down the hot, rugged sides, while within there is a steady rumbling and at minute intervals a discharge of hot ashes is shot from twenty-five to seventy-five feet into the air. The roar may be heard for miles. The volcanoes were well known to the early residents of this section. Engineers are planning to saddle the obstreperous volcanoes and make them useful to man.

THE EFFECT *of the* WAR ON BUILDING *in* CANADA

By Edwin Newsome

Editor of "The Sanitary Engineer," Toronto, Canada.

Edwin Newsome.

EDITOR "Domestic Engineering."—When war was declared the whole of Canada felt like a ship that nad just received a hit amidships from a torpedo. The whole business structure began to totter, and had it not been for the clear-headed business men in Canada the country no doubt would have become faint-hearted.

It may not be out of place to say that the United States never could and never will realize what a declaration of war is, because nine out of ten American citizens have been expecting almost anything for over three years. No one could say a few hours ahead whether you were or were not likely to be in the war so that when America did declare war, it was half expected, while with Canada 99 out of 100 never dreamed of a war. We, like yourselves, respected the German people too well to ever think that we could at a moment's notice be flying at each other's throats in a death struggle.

Then again, business was not in a very hearty state. We were in for a slack time and were trying to plan how to stave off bad times. Rents were high and wages were low. Too much money had been invested in undeveloped land, and houses in towns and cities were scarce.

Now, let me give you some idea as to how sanitary and heating engineers in large cities and towns right-about-faced and tackled the business of war. One large sanitary and heating engineering company had just finished a big job. One hundred and twenty of their men came into the shop. One or two of their number acted as spokesmen and asked to interview the manager. These men asked how the business outlook appeared, was there much work on hand or in view, etc. Receiving as answer that building was likely to be at a standstill, at least during the war, fifty-five of the hundred and twenty went right off to the armories and enlisted. Another concern had seventy men, of whom forty-nine joined the fighting forces, and remember these men were hardy and fit.

Well, such a sudden depletion in the ranks of labor very soon began to be felt, and manufacturers who had big stocks on hand were inclined to be pessimistic. But before any serious effects were felt, the demand for munitions began. War equipment of all kinds, just such lines, as are used in every day life, were required, only in a more flexible form. Canned goods, portable furniture, harness, boots, clothes, etc. and the men who had not enlisted were very soon picked up by the successful tenderers on war requirements. The rest of the men were kept busy on repair work.

Manufacturers of plumbing goods, as I said before, were well stocked up and at once began to look for war orders, shell making, etc. It is common knowledge that some of the largest plumbers' brass goods manufacturers were the first to turn out shells complete in Canada, and this fact had a great deal to do with the steadying influence, which immediately began to to exert itself throughout the trade. There were, of course, a number of plants, such as soil pipe foundries, and those making cast iron enamelware, which could not be converted into making war supplies, as well as some of the smaller brass shops, but these have nothing to complain of, taking everything into consideration.

I mentioned above that rents were high and houses were scarce. This was so in the early part of 1914, but six month after war was declared, it is estimated that in Toronto alone over 9,000 houses were empty, and rents went down with a slump. This did not really hurt anyone; in fact, it was a blessing in disguise. Landlords began to look after their tenants, visited them and were ready to make all kinds of repairs, remodeling bathrooms, etc., and I personally called upon a number of real estate people and showed them how they could hold their tenants by fixing up their heating plants, adding another radiator or putting in a new bathroom, etc.

Now, that kind of repair work had much to do with giving those sanitary and heating engineers work, who had men in their employ.

Then this also had an effect on the manufacturers to some extent and when repair work appeared to be slackening down, sanitary and heating engineers began to dig out and get work. Several members of the trade started new ideas, bought auto trucks and fitted them up with shelves and pigeon holes for fittings, so as to be able to carry a big supply of repair parts, even to a W. C. combination complete. One man has now three of these emergency trucks in use and they are doing well.

It was all a case of keeping a stiff upper lip, never starting a war discussion when in company with either a member of the trade or a manufacturer.

If you look over "The Sanitary Engineer" and note the steady advertisers, you can rest assured that they are the people who are getting the business. The manufacturer, who lost heart and ceased to advertise, is practically down and out, and forgotten.

I took a trip throughout Western Ontario recently and interviewed manufacturers and found them all in a very enthusiastic mood, full of hope, pleased at results from advertising, because with the shortage of men it was not possible to cover the field by salesmen, and advertising kept their lines before the people.

Our readers appreciate these facts and have openly avowed their intention to patronize those firms who have consistently supported their trade paper. I know this is true and so do the manufacturers.

It is just as necessary for the sanitary engineering trade that "Domestic Engineering" be published regularly, as it is vital to our lives that the sun should rise and set every day. Trade journals are the ballast of our ship of industry, no matter what trade or profession they serve, and sanitary and heating engineering journals are no exception to the rule.

Here is another startling fact: Sanitary and heating engineers were never good advertisers, no matters in what country they labored. You will, I am sure, agree with this statement.

Today it is not possible to pick up a Canadian paper that does not contain a "plumber's advertisement."

There is plenty of money in United States. You are a lending nation, while we are a borrowing nation. I would suggest your appealing specially to your readers in such a way as to show them that money invested in banks only draws a small percentage, whereas money invested in a bath-room and sanitary outfit is of greater benefit.

I once wrote a story along this line of how a farmer had $1,000 in the bank at three per cent. His wife chopped wood for the stove, pumped water or else melted snow, was more like a slave than a life-partner, etc., and how, if that $1,000 were invested in his own home, he could have a hot bath, hot water at the sink, inside W. C. accommodation, etc., all at a cost of $30 per year plus a small sum for deterioration, and do you know one of our readers took "Sanitary Engineer" out to a farmer he had met at the market, read the article to him and his wife, and in one week's time booked two orders, one for $1,000 and another for $700. The best of it all was that our reader came to the office, told me the story and spread it amongst a number of the manufacturers and jobbers. Such work does good, keeps everyone on the outlook for something original.

Are we down-hearted? No! We never were so optimistic before. One of our advertisers told me yesterday that although they were not now making shell parts, they had as much work and as many orders as would keep them busy all winter. In Toronto rents are up to top notch again, not a house to be had, and building prospects are rapidly improving.

"WITH ONE EAR AT THE RECEIVER."

By W. W. Hughes.

THE little old problem of overhead expense is one animal that will not lie down back of the old cannon stove and stay there. It bobs up every few days, and to me it is always interesting. The other day, I overheard a conversation between a master plumber and a prospective customer. From the drift of the conversation, it was apparent that the master plumber had made the prospective customer an offer to handle a plumbing contract, amounting to about ten thousand dollars on a time-and-material, and percentage basis.

W. W. Hughes.

It was also evident that the percentage asked for by the plumber did not look right to the customer. The plumber wanted 15 per cent and 10 per cent added to the cost of the labor and material, and explained that his overhead, based on labor and material costs, was 15 per cent, and that he wanted a profit of 10 per cent for handling the work.

The prospective customer then gave it as his opinion that no overhead was to be considered on this particular job, because, as he explained: "You will have this same overhead whether you do my job or not. My job, if you do it, will be handled in addition to your regular work, and therefore, there will be no overhead on it."

After considerable discussion, they made a deal based on an allowance of 15 per cent to the master plumber, this to cover both profit and overhead.

Strange as it may seem, in a visit to another master plumber a little later in the day, I encountered the same problem and the master plumber handled his end of the argument in this way. The prospective customer, as the master plumber knew, was a railroad man, that is he was some kind of a manager.

The master plumber argued as follows and closed the job with 20 and 10 per cent added. He said, "Mr. Railroad Man, there is a certain expense in connection with the moving of every train in your system. Your Limited leaves here every day at eight p. m. A certain number of the tickets sold for passage on that train are sufficient to pay that operating cost, the overhead in connection with it, and a fair profit in addition. When you have sold that number of tickets, do you sell tickets to those who apply after that time at a reduced price or do you exact the same price from one and all?"

The railroad man admitted that the same price applied to all who wanted tickets.

"Very well," replied the master plumber, "you can just assume that my establishment is a railroad system, and to conduct it along proper lines, it is imperative that I exact the same price from one and all."

The deal was closed at the master plumber's figures.

And then came the blow that almost killed father. In another shop, I found the girl bookkeeper and stenographer busily engaged on a stack of invoices. On one side of the machine there was a pile of invoices from one certain supply house, on the other side was a similiar pile, but with this difference, they were blank. The girl was copying the names, dates, order numbers, articles and quantities, but was raising the prices from 20 to 30 per cent.

One of several things was apparent: Either the plumber had stolen the blank invoices, or he had them printed for his own use, or the supply house had given them to him for some reason. If the latter was the case and it is the most probable one of the three, then it is almost certain that the supply house knew why the plumber wanted the invoices.

It is absolutely clear to me that the plumber had taken a time, material and percentage job and was increasing the percentage, with the knowledge and assistance of the supply house.

Therefore, this whole problem resolves itself into a continued study of overhead costs. We must arrive at certain averages, and these must be used as the basis for both contract and day work. And these averages must be correct, because we must be in a position to show our customers and prospective customers that they are right.

I understand that the printers have certain basic costs which are the result of study and surveys. Why not follow in their footsteps, instead of trying to beat the dog around the corner by quoting low percentages on time and material work and then trying to make it up with a sand bag.

FIFTY-FIFTY

By William Robert Marshall

JANE JOHNSON is the wife of Bill Johnson and Bill Johnson is a plumber over on "X" Street, right around the corner from "B" Street. Now you know who Jane Johnson is, but you don't know anything about her, and as this story has very much to do with Jane, we will have to tell you about her and her peculiar contract or arrangement with Bill.

About three years ago Jane was graduated from Normal and secured her certificate, permitting her to teach school. Jane could get $75 per month to start, and with a few years' experience could earn $1,000 to $1,200. Jane is or was rather a bright girl, or she couldn't have secured that certificate; as my wife once remarked, they ought to give any woman who goes through that course a certificate to sit on a throne.

There was only one drawback to Jane's certificate and that was Bill Johnson. Bill was a big "bear," six feet one inch tall and weighed 225 pounds stripped for action, while Jane was five feet, four and a half inches and weighed 110 pounds. Maybe that's why they were so much in love with each other; but regarding Jane, Bill and the *certificate*.

Of course Bill had wanted Jane to marry him long before she was through Normal, but Jane insisted that every woman should be independent of any man, and she was going through and get her certificate whether she ever had to use it or not.

Regarding getting married, Jane wanted to "know"—Jane is a very practical little woman—just what Bill intended to do for her to make up the loss she would incur, if she gave up her chance to teach school and be independent.

"Give you a home, Honey, and take care of you all my life," Bill always assured her.

"Make a home for *you* and take care of *you* all your life, you mean, don't you?" Jane always asked.

"But—but—what else do you want me to do?" Bill had always pleaded.

"Wait until I get through, and then maybe I will tell you," she had always answered.

So Bill had courted Jane assiduously. Jane was Big Bill Johnson's girl, and the rest of the boys didn't take any chances of incurring Bill's ire by making any overtures to Jane.

At the Commencement Exercises Big Bill was very much in evidence with a big bunch of roses and a diamond ring. The diamond ring he sent to Jane as a seal of their contract to wait until she was through. He didn't ask her anything about it; he just sent it and she took it in the spirit she knew Bill had sent it in, and that was, *now* you are through and I am going to claim you.

But although Jane had accepted the ring, she had not accepted Bill unconditionally, as Bill was to find out that night after the "doings" were all over.

"Now, Jane, my little bunch, now we can be married," Bill had said, as he crushed her to him at the first opportunity they had alone.

"Bill, you big bear, you're crushing my dress, besides you hurt, you Samson," Jane had answered him.

But Bill was happy and nothing Jane could say—outside of telling him positively that she would not marry him—mattered. "What's the day, Midget, what's the day?" he coaxed.

And Midget promptly slapped his face. The big brute ought to have known better than to call a little woman with a twenty-ton dynamic force, a midget.

"Bill Johnson, maybe you will not want me for a wife, when you learn the conditions under which I am going to marry you," Jane shot at him in all seriousness.

"What do you mean—conditions?" blurted Bill in perplexity.

"I am coming down to your shop tomorrow afternoon at three o'clock. See that you have the place swept out and a clean chair for me to sit on," she replied soberly.

"What—what the hotel bill—?" asked Bill in amazement.

"Now, Bill, kiss your girl goodnight and run along home. This has been a long, hard day for me and I am tired. I'll see you at three o'clock tomorrow afternoon and we'll talk it all over and find out if you really and truly want me as badly as you think you do."

"Suffering cats!" growled Bill, as he tramped down the front steps and climbed into his car. "I wonder has education got that girl 'nuts?'"

The next afternoon promptly at three Jane was at Bill's shop, and you can be sure Bill was waiting for her.

"Hello, peaches," he greeted her.

"Hello, big man," she smiled in return.

Bill escorted her into his office, presented the swivel desk chair to her and climbed upon the desk. "Now, my Queen, let's have it," he urged impatiently and anxiously.

Jane smiled at him. "Bill Johnson, you listen to me now and listen carefully, because what I am going to say and what you are about to answer is going to change two lives from this day on."

"Let her come," Bill urged soberly.

"Well, then, it's this. I have been thinking, thinking, thinking during the past year just what is the best thing to do. I have been very much in love with you, and that has made my thinking all the harder..

"You see, I don't want to *just get married* and let you take care of me. I want something else besides that. I want to be your *real* partner in life, not just in the home. Kissing you good-bye in the morning and kissing you hello when you come home. I want to be a *real partner*. I want to marry you and then come down here in this shop and help, and I want you to go fifty-fifty with me, win or lose."

Bill took off his hat and scratched his head.

"Fifty-fifty," he mumbled. "Say, kid, you can have the whole works. All I want is a chance to work for *you*."

"No, no, you don't understand. I want to be a strictly fifty-fifty proposition. If you take twenty-five dollars to buy a new suit, I take twenty-five dollars to do with as I please. If you draw out five dollars to spend on cigars, drinks or anything, I take out five, and at the end of the

year we split fifty-fifty on any money that has been made. Don't you see, Bill, I want to be a **real, regular** partner, not a make-believe one."

"The home——?" Bill began.

"We split the expenses fifty-fifty—and on the automobile and every other thing. I even pay for my own theatre tickets, and half the supper bill afterwards. Do you understand?"

Bill nodded his head; it was whirling.

"And, Bill, for that half share in you and all you've got I'll give you a half share in me and all I've got. I am coming down here and learn the plumbing business. Keep the books and help."

"And when can we begin?" Bill stammered.

"We can just make Santa Ana in nice time for supper, if you hurry," she smiled.

"Yes," Bill blushed, "you see, that's one of that nut Marshall's ideas. You know he always claims *price* doesn't cut much figure anyway, and one day he and I were talking about it, and he offered to bet me a new hat for next Christmas that I could add a dollar to every ten dollar job I did and get it, and then give you the lump sum at the end of the year."

"And——" Jane's eyes were twinkling.

"And I did it, and it didn't make any difference—and you have three hundred dollar's worth of Liberty Bonds." Bill puffed out his chest.

"But Bill, dear," Jane expostulated, "how did you manage to get the money out of the firm without me knowing anything about it?"

"Oh, that's where I was cute. You see, my dear, I kept a little book and I kept strict account of it, so I knew just what it was each month. Then I padded the gasoline bill, the tire bill, the oil bill or some other bill and got the money and put it in the bank. See?"

"Bill, You Big Bear, You're Crushing My Dress, Besides You Hurt, You Samson."

And so to Santa Ana, the eloper's paradise, they went.

That's three years ago and the contract still holds good. Bill and Jane split fifty-fifty, and there are no arguments in that family about money.

But this is a Christmas story, and I nearly forgot the real story.

Christmas morning Bill handed Jane three one hundred dollar Liberty Bonds with his compliments.

"What are these for?" Jane had demanded in amazement.

"For Jane" Bill smiled.

"But, Bill, where did you get the money? With business so dull this year on account of the war, I know you can't afford to spend three hundred dollars on me out of your fifty per cent, and you need so many things," Jane pleaded, with tears of joy in her eyes.

"Oh, it's all right, Honey, it's all right. You see, that's a little extra money I made," Bill laughed sheepishly.

"Extra money!" Jane exclaimed.

Jane was holding her sides and tears were streaming down her cheeks with laughter.

"What's the joke?" Bill demanded half angrily.

"Oh, you big kid, you big kid!" she shouted, "don't you see you made me pay one hundred and fifty dollars on our fifty-fifty contract?"

Bill stared at her in amazement and then, as the truth dawned on him, he blushed to the ends of his hair as he stammered, "Of course, of every dollar I knocked down fifty cents belonged to you. Fool that I am, and I thought I was doing a smart trick."

"Never mind, dear," Jane entreated softly, as she put her arms around him. "We'll just put these away as a Christmas present to little——"

"Bill," murmured the big bear.

"Jane," smiled the little woman.

PROGRESS *in* PLUMBING *and* SANITATION

By Thos. J. Claffy

Assistant Chief, Bureau of Sanitation, Chicago.

THE WAR has brought out the importance of sanitation in connection with efficiency and military success in the vast operations on every battle front. Eternal vigilance is necessary to maintain proper standards of cleanliness in every phase of camp life. Personal habits of soldiers and men in army life receive as close attention as ever was given by any "fire-eater" to his ammunition supply. An army fights on its efficiency. Army stomachs and army feet are no longer in first place.

Efficiency depends upon good health. Without that there can be no physical and mental stamina, and without such there can be no success from any military machine. The sanitarian today is the big fellow in the National game of military operations. He specifies and provides the means for maintaining army efficiency.

Pure air, pure water and clean, well-cooked and properly served food are as necessary as powder and shot, big guns and proper clothing.

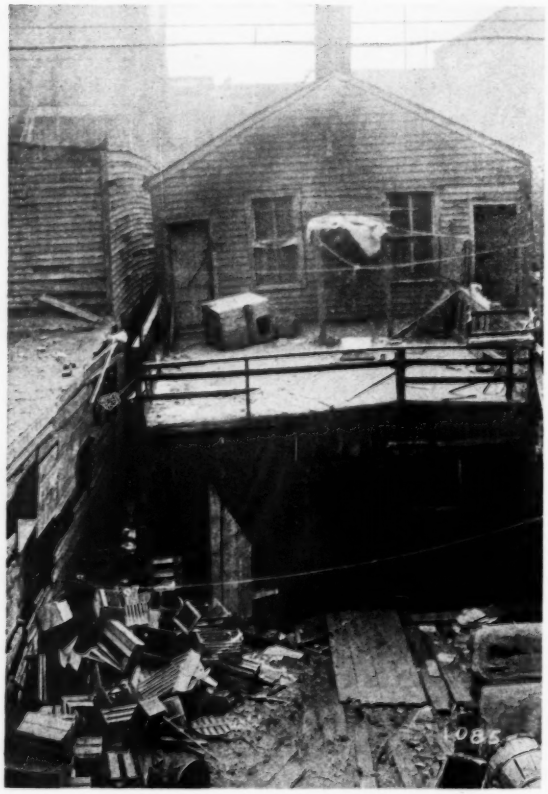


Fig. 1.—Where Primitive Plumbing is Found.

The sanitary engineer lays out and supervises the water supply, and plumbers in the engineering regiment install it. They also provide the plumbing for toilet, lavatory and bathing purposes.

Ventilating engineers look after the building of barracks so as to provide ample light and sufficient air movement to insure a free supply of clean, fresh air at all times.

Bad Air a Menace.

It is universally recognized that a great many of the common ills of man are due to the breathing of vitiated and contaminated air. That fundamental fact was long ago recognized in connection with plumbing and drainage in buildings. Foul drain air was a nuisance then as it is now. Traps were designed to maintain a water seal as a barrier against such. Later it became necessary to provide vents, revents, etc., to prevent loss of such seals.

Fig. 2.—Open-Tile House Drain, Cause of Frequent Flooding.

Progress in Plumbing.

It is a fascinating and interesting study to trace the prog-

ress made in the last 50 years in the plumbing craft. From a mere craftsman's art, the making of lead bends and traps, the lining of tanks and the jointing of pipes, it has rapidly developed into a scientific engineering profession.

It has been a hard road for the average plumber and he has given his skill, energy and ability, and even sacrificed his life in following a calling which he loved, to reap in return, not the gold or money bags, so commonly ascribed to him, but a mere pittance, and an early grave.

In the days when Chicago was young and only the wealthy could have plumbing in the house, engineering and plumbing were not closely related. The house sewage was discharged into an open ditch or a hogshead in the sand (Fig. 1). Later a sewer system was provided. Then plumbing began to have a place in building construction. One of the bad habits formed then still remains—that is the tile pipe house drain. This is about the only large city in this country that permits its use. As a result we have frequent flooding of cellars and conditions such as are indicated in Fig. 2.

Modern plumbing is a science. It is closely related to sewage treatment. Standards in cast iron pipe and fittings have been adopted; others will speedily follow. Standards for pipe sizes and materials should come next. That plumbing

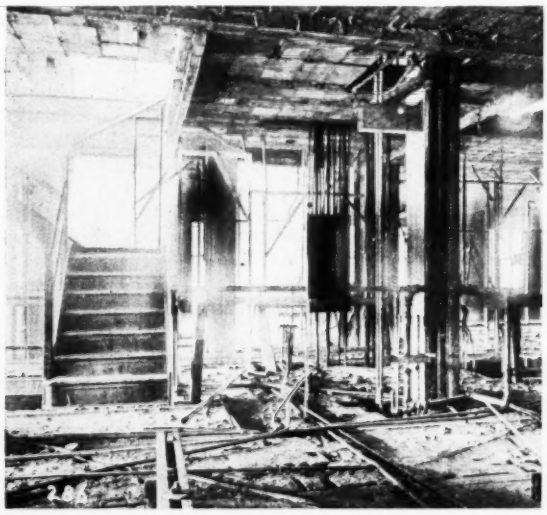


Fig. 3.—A Maze of Pipes.

now is complicated and requires much thought is due to the complexity of modern requirements. Tall building construction has intensified this problem.

The population of what would be considered a good sized town a generation ago is now housed in one modern office building or hotel. The illustrations, Figs. 3, 4 and 5, may serve to indicate what a difficult thing it is for the engineer or plumber to plan such installations. "Laying out" the pipe lines is simple. How to install them with the maze of pipes for other purposes is difficult. More difficult still is the problem of so proportioning sizes and branch connections in very high buildings that trap seals may not be broken and the contents of closet bowls and urinals thrown out upon the floor. This is a phase of modern plumbing well worth study and many clever minds are now seeking the solution of the problem.

After-the-War Conditions

The fathers of our plumbers in army service must look well to their knitting or find themselves back numbers, when Johnny comes marching home.

He will have stored up in his wise head experiences greater than otherwise could be attained in a lifetime.

The discipline of army life will remain and Johnny, our hero plumber and soldier, will think fast, will get there

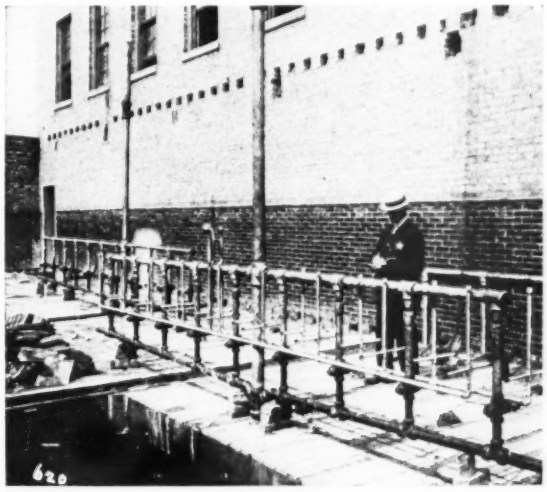


Fig. 4.—Careful Planning Required to Make All Things Fit.

promptly in the shortest possible time and will be thorough and accurate in his accomplishments.

If he decides to find out how to prevent trap seals in high buildings from being broken, he will solve this problem in a new and better way.

It is well that we older Johnnies bestir ourselves.

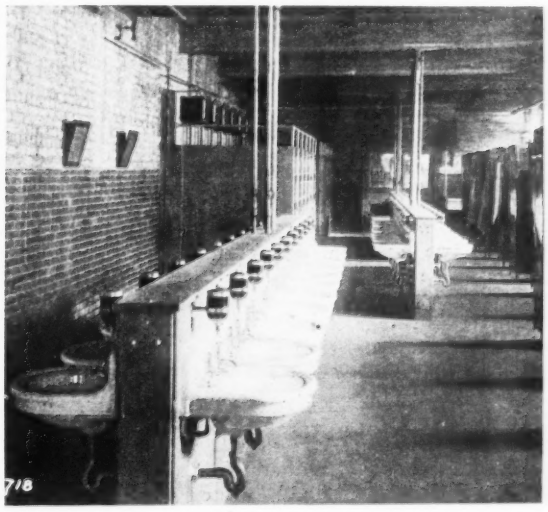


Fig. 5.—As It Looks When Finished.

Business conditions after the war should be better than ever, and no doubt they will be.

With the re-opening of the world's markets and the return to normal activity in all lines of industry, building construction will doubtless regain all its old-time vigor.

It is to be hoped that we will have the energy to pave the way for the awakening, to greet our soldier sons with a clear conscience and a feeling that we have done our share in preparing for the dawn of a great and prosperous future in the science of plumbing and sanitary engineering.

SOME FACTS ABOUT *the* EARLY HISTORY *of* STEAM *and* HOT WATER HEATING

First Knowledge of the Possibilities of Steam and Hot Water Came to the Ancient Romans

By John A. Ward

THE man who discovered steam is unknown. Its discovery is therefore hidden in the remote niches of antiquity. Little did the ancients realize in their first contact with steam or hot water that they were in the presence of a power, which would one day prove of very tremendous and vast significance in the progress of man as a civilized being. In later centuries its possibilities began to be dimly discerned, and yet nothing more definite was known of its power, than we know of the uses to which radium may be put 300 years from now.

Heating by hot water, for instance, was an invention of great antiquity. According to Seneca, the Roman historian, we learn that the baths of Rome were warmed by water running through brass pipes, which at one point were heated in a fire. With the fall of Rome this method of heating seems to have been forgotten.

During the heyday of Rome's glory, we learn of the use of hot water in the baths of Caracalla, built by the Emperor Caracalla. Here water was heated rather ingeniously. Close to the furnace was a calidarium, the copper ahenum for boiling water, near which was the copper for warm water, the tepidarium, and at a distance of two feet from this was the receptacle for cold water or the frigidarium which was often a plastered reservoir. A constant communication was kept up between these vessels, so that as fast as hot water was drawn off from the calidarium, a supply was obtained from the tepidarium, which was being already heated, but slightly reduced the temperature of the hotter boiler. The tepidarium again was supplied from the frigidarium and that from the aqueduct. In this way the heat which was not taken up by the first boiler passed on to the second, and, instead of being wasted, helped to heat the second. The water of an aqueduct was brought to the castellum or top of the building and was allowed to descend into chambers over the hypocaustum (vaulted room heated by furnace below) where it was heated and transmitted in pipes to the central building. Remains of this arrangement are to be seen to this day in the baths of Caracalla.

Steam or vapor was first put to practical use by the Romans in these baths, which were luxuriously constructed, the rarest of marble, entering into the work of construction. Often tubes of brass or lead carried the steam through the walls of the bath compartments. Apertures in the walls, which could be closed or opened, would permit the escape of sufficient steam or vapor to induce perspiration upon the body of the bather, who then entered another room containing a plunge bath of warm water. These steam or vapor baths, while crude as compared with the modern type, nevertheless embodied the correct principles and paved the way for those many improvements that finally brought the splendidly equipped baths of today.

In 1615 Solomon de Caus was imprisoned in a madhouse for proposing steam as a motive power. He was an architect and had held several important positions. He wrote a great many scientific papers, of which, however, no one took much notice during his life, and finally, when he was seized with an idea of the possibilities of steam, his friends and relatives feared that he had lost his reason.

After pestering the king and the cardinals at Paris, he was ordered to be taken to Bicetre—the madhouse—and there shut up. This was done.

They had just one way with mad people in those days. They shut them in iron cages and fed them through the bars like wild beasts. They did this to Solomon de Caus. For a long time he stood behind the bars and called on those who would listen, and to them repeated the story he had told the cardinals. He became the jest of the place. Some of them gave him writing material, and then amid the misery of his surroundings, he wrote down his ideas and amused the jailers so much more.

However, it could not be long before such a life, such surroundings, would shatter any brain. In time Solomon de Caus was as mad as everyone believed him.

It was in 1624 that an English nobleman, Lord Worcester, went to Paris and visited Bicetre. As he was passing through the great court, accompanied by the keeper, a hideous face, with matted beard and hair, appeared at the grating, and a voice shrieked wildly: "Stop! Stop! I am not mad. I am shut up here most unjustly. I have made an invention which would enrich a country that would adopt it." "What does he speak of?" the Marquis asked his guide. "Oh, that is his madness," said the man, laughing . "That is a fellow named de Caus, from Normandy; he believes that by the use of the steam of boiling water, he can make ships go over the ocean and carriages travel by land; in fact do all sorts of wonderful things. He has written a book about it which I

can show you." Lord Worcester asked for the book, glanced over it, and desired to be conducted to the cell of the writer. When he returned from his visit, Lord Worcester was weeping. "The poor man is certainly mad now," said he to the guide, "but when you imprisoned him here he was certainly the greatest genius of the age. He has made a very great discovery."

Lord Worcester made many efforts to procure the liberation of the man, who he believed could be restored to reason by freedom and ordinary surroundings. Lord Worcester efforts were in vain, however.

Heating by hot water was introduced into France in 1777 by M. Bounemain, where it was used for warming hot houses in the Jardin des Plantes in Paris. In 1816 heating by hot water was introduced into England by the Marquis de Chabonne. It was used in Canada for many years before becoming popular in the United States. Heating by steam was proposed in the middle of the eighteenth century by William Cook, of Manchester, England. In the United States it was not introduced till a century later. The first building in America heated in this way, was the Eastern Exchange Hotel, of Boston, erected in the "Forties," of the last century.

It is claimed that the birth of the steam heating business in this country is to be credited to James Boyce, an Englishman, who embarked in the business at 38 Ann Street, New York, in 1840. It was in that year that he placed on sale a small stock of butt-welded pipe, two inches in diameter and under, in addition to some other articles which he had brought over from the old country. This stock was bought by James J. Walworth, of Boston, in 1841, after correspondence with Joseph Nason, who was then in England, with the idea of both dealing in pipe and constructing the Perkins hot water apparatus. Mr. Boyce then departed for England, but Gardner D. Hiscox, his clerk, remained at the New York store for some time. Walworth conducted the business until 1842, when Mr. Nason returned from England, and the firm of Walworth & Nason, well known in the early days, commenced its active existence. A store was opened at 18 Devonshire Street, Boston.

It appears that at this time no pipe was made in America. Mr. Walworth was told by Joseph McCully, who was superintendent of Morris, Tasker & Morris Tube Works, and by John Russell, who claimed that he drew the first tube ever made, that these tubes were not made until 1842 or later.

In the autumn of 1842, Walworth & Nason, installed their first heating apparatus of the Perkins hot water type, at the county room of the Middlesex Co., at Lowell, Mass. The boiler of this and subsequent apparatus was simply a circular coil of one continuous tube, such as was afterwards adopted for heating railway cars.

Perkins used no valves, but Nason found that in dwelling house apparatus, it was better to divide the radiation into several sections for the various rooms to be warmed. He therefore devised a stop cock of a peculiar construction, with a stuffing box, not intended to make a perfectly tight closing of the circulation, but tight enough to reduce it to a minimum, so that the temperature of each room could be regulated independently. This effect was obtained, but Messrs. Walworth and Nason thought it not quite safe to construct an apparatus in which all the surface might be shut off at once, so they decided to discontinue that type of apparatus and place all the heating surface in a chamber or chambers in the basement, with the warm air pipes leading to the several rooms, or precisely the indirect apparatus of today.

At about this time, Mr. Nason conceived the idea of using small pipe, ¾ inch or 1 inch in diameter, for heating by steam, in place of the large cast iron pipes then in use in England and in a few mills in this country. About March, 1845, Walworth & Nason contracted to put into the Eastern Exchange Hotel, of Boston, near the East Boston Ferry, the first steam apparatus in the world, using small wrought iron pipe. On April 7, 1845, Mr. Walworth went to Burlington, Vt., to plan the warming and other steam apparatus for the Burlington Woolen Mills, the first apparatus of this kind. On September 9th, he started a similar apparatus in the Manchester mills. Two days later, on September 11th, the apparatus in the hotel previously referred to, was tested and it was found satisfactory.

The next year, 1846, also saw the first globe valve devised and made by Mr. Nason. In 1846, heating work was installed in the Boston Custom House, the apparatus deserving mention as being the first to use a fan blower in connection with an indirect coil. The apparatus was easily successful and afforded an ample supply of fresh air and heat. In it the exhaust steam for the engine was used for heating the entering air as well as the direct steam.

In 1853, Mr. Walworth installed a hot water apparatus in the White House at Washington. It seems that Colonel Chas. G. Green, editor of the "Boston Post," was in Washington when the White House was being put in order for the newly elected president, Franklin Pierce. The heating of the house had always been execrable; there was one cold corner in particular which General Jackson graphically declared that hell itself would not heat. The question of what should be done was under discussion in the presence of Colonel Greene. He told the commissioners, of whom Captain T. L. Lee was chairman, that he knew a man in Boston who was ahead of the rest of creation on that subject and Captain Lee said: "Send for him." Mr. Walworth was summoned to Washington at once, going on March 23, 1853, and a contract was made and closed June 1st, amounting to $7,000. A large indirect hot water apparatus was put in before the fall of the year and is said to have given satisfaction.

Before 1852 Walworth & Nason had invented and placed on the market the steam trap, the globe and angle valve, the check valve, the back pressure valve and the scroll die plate. They also were the first to use cast iron and later malleable fittings instead of forgings, and the horizontal tubular boiler with small tubes. Beginning with almost no capital in 1841, and working without appreciable profit for several years, the business gradually increased so as to show annual profits of $25,000 for a number of years, the sale of pipe alone amounting to $100,000 per annum. Before 1850, Walworth & Nason had completed contracts, aggregating hundreds of thousands of dollars, sold millions of feet of pipe and many tons of fittings, both cast iron and malleable, and placed the whole business of steamfitting on a high basis.

A volume might readily enough be written upon the history of steam and hot water heating, but it is merely the purpose of the writer to touch the high lights, as it were, of this copious history which is filled with an interest that borders upon romance.

The progress, which the heating trade has made since the early days, has been very great, particularly in the invention of new heating devices. The fundamental laws of the science of heats—laws laid down by Peclet as early as 1840—are still largely relied upon.

RAYMORE *and* COMPANY
PLUMBING *and* HEATING
SUPPLIES

By Daniel Louis Hanson

PHIL HARTON laid the package of trade papers on the edge of the desk and took the chair Mr. Raymore pointed out to him. "I see," he said, "that second class postal rates are to be advanced."

"So the press states," replied Mr. Raymore, looking out into Mulberry Bend Park, the dinginess of which was being brightened by the rapidly falling leaves, adding of their golden and russet colors, "and that means probably higher prices on advertisements. Also that advertisements are to be taxed. What else in the way of woe this morning, Phil? Let's have the full measure of your cup of grief."

Harton reached for the bundle of trade papers. "I have here a list of the advertisements we are now running—this," and he handed a typewritten sheet to the Boss. "And here is what we had better run in the future." With that the sales manager sat back with a well-satisfied air.

Mr. Raymore cast his eyes to the footings of the two comparative columns, then looked quickly up at Harton. Gravely he returned the sheets to Harton and resumed his former occupation of watching the falling leaves in the Park, at the same time tugging away at his portiere whiskers. It was some minutes before he spoke, then without turning to his sales manager:

"I think it was in Covent Garden, London, that I saw The Mikado. His Royal Highness was good enough to invite me into his box—cut that part out, I would rather think of Democracy in these days!—but in the opera, or am I mistaken about the title? Well, there was a scene where the royal high executioner entered with his snickersnee of a sword looking for victims. There was one who rushed forward, bared his proud neck and threw himself on the floor a ready victim for the curved blade. I never felt so like jumping down on the stage and kicking an actor as I did him. If it hadn't been for his royal——"

The Boss leaned forward to more easily watch the fall of a certain leaf, which paused midway in the air, as if undecided what direction to take—or to remain aloft in a state of suspension.

"Now, I am not suggesting an analogy between you and the victim who bared his proud neck that night in Covent Garden. All he had to offer was his neck; you are deliberately putting this entire business, with its ten millions of annual sales, its unbroken prestige for square dealing and up-to-the-minute policies on the altar of sacrifice. He only offered himself; you are deliberately trying to give away my property and business reputation. Wait a moment! You are placing me in the position where business men, my peers, can say of me, 'Raymore is a quitter; he couldn't read the signs of the times aright It wasn't a storm that was coming, but a strong trade wind. He reefed sail and dropped anchor right in midstream with the result that we, going ahead with every stitch of canvas out, ran him down. A mighty fine fellow, that Raymore, but he didn't understand navigation, when there was money in so doing.' That's what they would say of me or over me, if I followed your plan"—the Boss pointed to the sheet of figures which Harton had laid on the desk again—"of reducing our advertising appropriation."

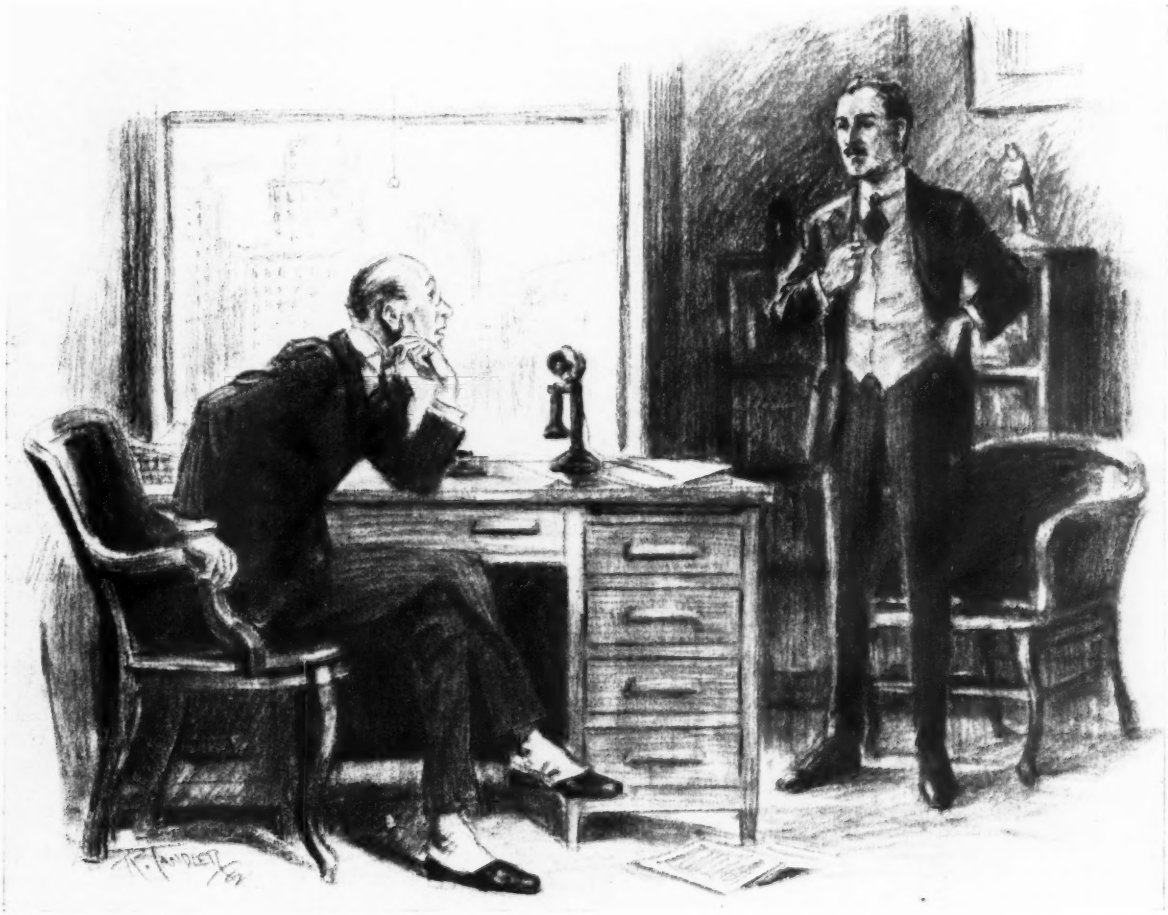
The leaf had fallen and lay with others on the dank ground of the Bend, and the Boss gave a little sigh as if sad over its common fate. "Do you look upon advertising as so much deciduous foliage that blooms to the eye for a few brief months, then is trodden under foot? Phil—by the way, are the orders off your desk so you have a few minutes? Advertising such as ours isn't the leaf, but it is the growing tree. The leaf has its function. is budded and wilts in turn, but the great roots down there, possibly a hundred feet below this filthy pavement—that's what the world is interested in. You know Moses Irons personally, Phil? Am sorry, for he is by far the leading man in our line at this day, as he has been for the last thirty-five years. I think I shall tell you briefly what Moses Irons has done in advertising."

"You know I inherited this business. It came easy and I guess I have done but little to carry it on, simply to insist that the policies of my father and uncle be lived up to, but Moses Irons built his establishment up from the very foundation stone till today it is doing nearly, if not quite, twenty millions a year. He came from New England, as have so many others in our line of plumbing and heating, to Chicago and in 1880 began selling pipe and fittings and telling people that he was doing so. Trade papers weren't so plentiful in those days, nor was even newspaper advertising general, but Moses took a few inches in the Tribune to tell the trade he was in town and—here was the particular shrewdness of his move—to let the public know that Moses Irons' pipe and fittings were the best to have, suggesting they insist on getting them from their plumbers and fitters. I remember Moses telling me in later years how Joe Medill, the founder of the Tribune and its then manager, snorted at the make-up of that ad.

"'You had better let us write your ads, young man,' Mr. Medill said to him.

"'Show me a better one, and I'll be glad to do so,' was Moses Irons' reply to the well-meant, though ungraciously put, offer. To this day I see the brains of Moses Irons in every one of his ads, though possibly the copy work is done by others. When, a year or so later, men with vision but not over supplied with cash came and talked to Mr. Irons about trade papers in our line, the ironmaster

reached into his pocket and said, 'Put me down for a page ad. And I'll help to get your circulation list started,' which he did by actually asking his trade for subscriptions, insisting in fact that they pay over their dollars. 'You and I can only build up a big line by having an active trade press,' he said. That has been his undeviating policy ever since, and he has nothing but terrific scorn for the supply man who makes it a rule not to advertise. 'Parasites—nothing but parasites! They live on the advertising that some few of us indulge in!' was the way he expressed himself out in Chicago recently.



Phil Harton Rose to Go: "Then You Intend to Keep Advertising Full Blast in Spite of—" "Because of It, Phil—Because of It. And More Advertising Rather Than Less."

"His advertising in the Tribune paid him, though later he found other mediums outside of the daily press, as being of better service to him, particularly the new national magazines, which sprang into life during the latter eighties. It was Moses Irons and two or three others who made possible the upward swing of that new science, Sanitation. I remember how he enthused Potter Palmer, the proprietor of what was then the leading hotel in the west, into pulling out whole batteries of closets recently installed and replacing them with sanitary fixtures—the first break away from the pan closet. Edward Baggot, one of the pioneers of real plumbing, did the work. I heard Mr. Palmer say:

"'One sort of feels ashamed of himself, if he isn't right up to the front line of a Moses Irons ad.'

"Moses was advertising as much, if not more, for the entire line, for every master plumber in it, for the benefit of the public at large, as for himself. But he knew that no business man can lift himself up by his bootstraps alone; something else has to come with him.

"So the trade press was built up by the Moses Irons of our line, by manufacturers and jobbers who saw that without it there would be no real development of the line, that it would plug along on low levels—the cheapest the most sought after. Without the trade press most of our customers would be carrying on their businesses in basements. And such magnificent gatherings as the state and national conventions, with their inspiring and upbuilding influences, would have been impossible.

"Of course, the continuous campaign brought results direct to Mr. Irons in the way of increasing business; he started with nothing and has earned every cent of his capital. Business came rolling in to him, but more than that—or as much—were what he called the by-products of advertising. The one which he put above everything else was the stimulus his employees received from seeing the name of their employer in print. All of us thought it a big feather in our cap when we had stolen an employee away from Moses Irons, but oftentimes the new blood sort of dried up on us after a time. I remember asking a salesman, whom I had gotten in that way, how it was that he was petering out.

(Continued on Page 487.)

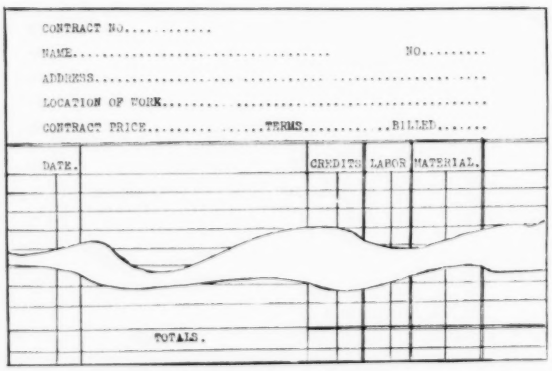
COST-KEEPING SYSTEM *for* PLUMBING *and* HEATING CONTRACTORS

An Estimating and Cost System, Which Permits the Estimator to Check His Material and Labor Estimates Constantly With the Actual Material and Labor Required, and Which Makes it Necessary That Each Workman Put in an Honest Day's Work

By Wilfred G. Astle

MODERN business life, with its extraordinarily keen competition, has forced plumbing and heating contractors to adopt methods to disclose, more minutely and with greater precision than formerly, the cost of production. The successful plumbing and heating contractor, like most business men, is too busy personally to supervise all the details of his business, but nevertheless, it is possible for him to so organize his business and to so systematize its various details as to bring to his own attention and to the attention of his subordinates all errors and deficiencies. Cost-keeping may often be overdone or over-systematized. In fact, a critical study of the conditions prevailing in some of the large manufacturing establishments results in the conviction that great dangers are to be apprehended in connection with systems that are too complicated, not being systematic and giving records that confuse rather than enlighten.

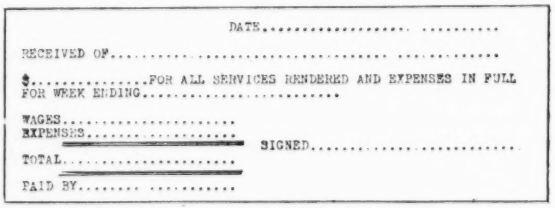
The estimating and cost system described in the following, permits the estimator to check his material and labor estimates constantly with the actual material and labor required. It also makes it necessary that each workman put in an honest day's work and will readily permit errors and differences to be detected and rectified. Moreover, it does not entail a great amount of labor for its successful operation.



Form No. 1.—Contract Envelope.

Form No. 1 shows the contract envelope, size 6¼ in. by 9½ in. The other forms are all of such size as to permit them to be inserted in this envelope without folding, except the estimate sheets, which are folded once. All these envelopes are numbered, also a complete description of the work undertaken, contract price, terms, etc., are given. Space is also provided in which the bookkeeper records from day to day the cost of the labor and material for the corresponding job. A column is provided for entering credits for any material returned. The labor, material and credit charges are obtained from the daily time and material vouchers of the men. Practically the same form is used for material returned as for material taken out. The form employed for returned material is printed on a different color of paper and is headed "Credit Slip," the remainder of the form being the same as shown in Form No. 8. The labor and material totals as found on the front of the envelope are added, and all credit for materials returned is subtracted from this total, thus giving the total cost of a job when completed. This total cost is also entered on the estimate sheet and compared with the estimated cost.

Form No. 2 is a wage receipt. When the workmen receive their wages they are required to sign this form. In this way no differences over wages and expenses between the company and its men can occur at some future time.



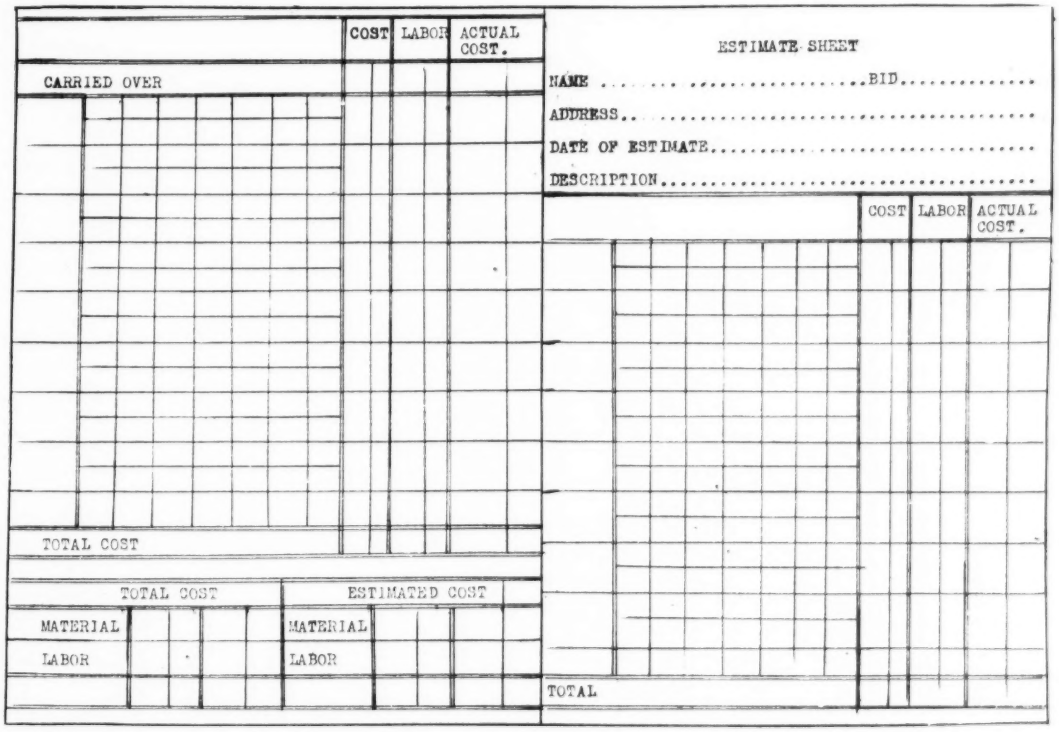
Form No. 2.—Wage Receipt.

Forms Nos. 3 and 4 shows the two sides of the estimate sheet when in the unfolded condition. The left-hand column of each page is devoted to a list of the materials required, the list being carried over from page to page. Underneath the various reminders, the estimator places

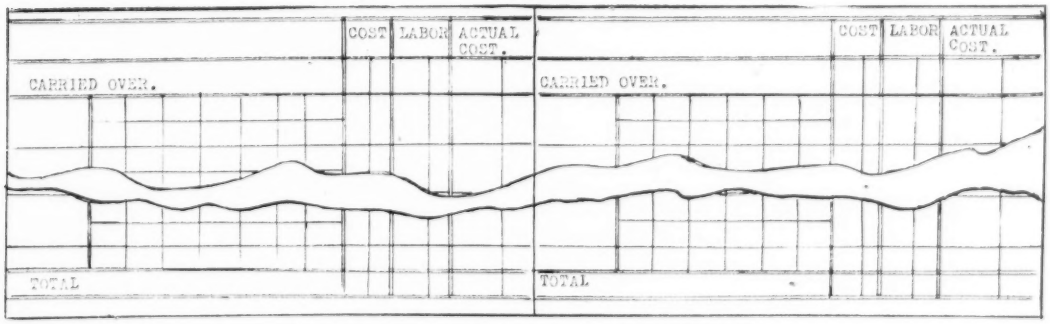
the amount of such materials as he estimates will be required. In another column the estimated cost of such material is entered, and in still another column the estimated labor required for installing it. The estimated cost of labor and material is totalized on each page, and the amount carried over to the next page, the grand total being drawn on the fourth or last page.

In the narrow columns to the left of the column devoted to the estimated cost of the various materials listed such errors. Moreover, this estimate sheet shows at a glance any case in which more material than estimated has been sent to a job. When such a condition exists it is, of course, immediately investigated. The material actually used will then be checked and any loss or waste of material learned. If no loss or waste has occurred, the estimator's attention is called immediately to the deficiency in his estimate.

Weekly time vouchers, as shown in Form No. 5, are



Form No. 3.—Showing last and first pages of Estimate Sheet.



Form No. 4.—Showing Inside Pages of Estimate Sheet.

are entered the amounts and costs of the materials taken to a job from time to time as shown by the material vouchers taken out by the men performing the work. When material is returned, its amount and value are entered in red ink in these columns. To the extreme right of each page a column is provided for the actual cost of the various materials installed.

It is thus seen that the estimator can readily check his estimates with the actual material and labor required. In this way his errors are called to his attention, and in making future estimates he can guard against repeating required to be sent in once every week. They are used in order to permit the bookkeeper to check his payroll.

Form No. 6 is a Job Report Blank. The superintendent fills out this form on his visits to the various jobs under way and hands it in to the office every day. He retains a carbon copy of the reports, and is thereby able to tell at a glance the progress made in the work. These reports serve to check up the reports of the workmen and also to show how closely the superintendent keeps in touch with the work. The estimated labor required and the labor to date are also entered on these reports.

It will be noticed that the weekly time vouchers of the men and the report forms for the superintendent are all provided with spaces for the workmen or the superintendent to give their addresses. In this way the company are able to learn of any changes in the addresses of its employes, a consideration that is valuable at times when the company must get into contact with its men in the minimum amount of time.

NAME..... ADDRESS.....
DATE.....

	HOURS	EXPENSES	AMOUNT	REMARKS
MONDAY				
TUESDAY				
WEDNESDAY				
THURSDAY				
FRIDAY				
SATURDAY.				
TOTAL				

Form No. 5.—Weekly Time Voucher.

Form No. 7 is a Contract Record Blank. A contract book is maintained and the original of these forms retained in the book. Every alternate page of the book is of a different color and is designed for the purpose of making carbon copies which can be torn from the book. These carbon copies are filed with the other forms in the envelope for the corresponding job, thus guarding against possible loss of the originals.

It will be noticed that a complete description of the

REPORT OF JOB

NAME.....
ADDRESS.....
WORK DONE.....
.....
.....
MATERIAL WANTED. .....
.....
.....
.....
.....
LABOR ESTIMATED.....
LABOR TO DATE.....
WORKMAN.....
HELPERS.....
.....
.....
DATE..... SIGNED.....
SUPT.

From No. 6.—Job Report Blank.

work to be performed, the location of the buildings, etc., in which work is to be done, charging directions, estimated cost, terms, number of contract envelope, date of billing and the ledger number, together with the date and the necessary signature, are all given. These contract-record forms are made out in duplicate, as described above, as soon as work for which a contract has been awarded to the company is actually undertaken.

Form No. 8 illustrates the material voucher employed. The actual costs of materials are entered on the voucher and any incidental charges for the handling of the material. A space is also provided for the workmen to give their hours of service and expenses. These vouchers are taken from pads in which they and the storekeeper's copies are arranged in numerical order.

Form No. 9 is a reproduction of the daily time vouchers of the workmen. Instructions are given to the effect that a complete, detailed account of work done must be made out and that the slip must be sent to the office at the close of each day. On the back of the vouchers spaces are provided for giving the amount and sizes of various materials installed. Space is also provided for a list of materials needed. These time vouchers are turned in daily, together with whatever material vouchers may have been obtained the same day. The labor vouchers are, of course, employed for computing the workmen's pay at the end of each week and for making the proper charges.

Advantages of This System.

The state of all work can at any time be learned immediately and with comparatively great accuracy.

As the estimator has all the variations in the amount of

NO.....
NAME.....
ADDRESS.....
CHARGE TO.....
ADDRESS.....
PRICE.....
TERMS OF JOB.... .....
NATURE OF WORK.....
.....
.....
.....
.....
DATE.....SIGNED.....
DATE OF ESTIMATE.....
CONTRACT ENVELOPE NO.....
DATE OF BILLING.....
LEDGER NO.....

Form No. 7.—Contract Record Form.

material and labor estimated from the actual amount of material and labor required brought to his attention, he can guard against repeating previous errors.

A constant check can also be maintained on the performance of the workmen.

The foremen will detect and investigate any apparent deficiency in the performance of the men under them.

The workmen, knowing that their performances as entered on their time vouchers are seen by their employers, naturally aim to maintain as good a showing as possible, with the immediate desire to hold their jobs and the remote ambition to sometime themselves have the opportunity to investigate the performance records.

The entering of all material and labor charges on the forms employed is advantageous in that it not only shows the accuracy of the material and labor estimates, but it also shows any loss or waste of material. The envelopes

are all placed in a file, and upon the exterior of each envelope a general idea of the nature of the contract is given. All material, labor and credit deductions are entered on the face of the envelope as previously explained. When a contract is completed, the corresponding envelope is stamped "Billed" and the date of billing given. A rubber stamp reading "Profit Recorded" is also employed for stamping the envelopes as soon as the profits are recorded. The usual bookkeeping ledgers are maintained, the ledgers being numbered. The envelopes are filed according to contract numbers and are retained in the files permanently. If at any time an envelope for any contract is desired, it can be located by means of a card index giving the contract numbers corresponding to those stamped on the various contracts.

Conclusion.

There is more reason now than at any other time for many years why contractors should consider most carefully the problems of finance and management of their business undertakings. Facing the tendency towards higher wages which inevitably follows the increased cost of living, and especially the increased cost of food, which makes up such an important part of the workingman's expenses, contractors should necessarily be interested in ways and means of making their industrial operations more efficient.

There are still some plumbers who do not realize the importance of a good cost and accounting system. Nevertheless, the knowledge that it supplies is a valuable business asset, as well as a powerful aid to efficient management. The best possible evidence of this statement is that progressive and successful manufacturing firms are making liberal expenditures for work of this character, because they realize that the present-day trend of business is in the direction of a more exact and scientific knowledge of every important detail. Success by rule of thumb, or from energy and enthusiasm alone, is becoming more and more impossible. "The man who knows and knows he knows" is the man who wins. Success in any business is also largely dependent upon the promoter's intimate knowledge of underlying details, which is a practical cost-keeping system.

NO..... BOOK NO.....
DATE.....
NAME.....
ADDRESS.....

AMT.	MATERIAL.	COST	CHARGE

NAME	HRS	PER HR	AMT	EXPENSES

SHOP ORDER.....NO.....
CONTRACT.....NO.....
LABOR AND MATERIAL.....NO.....
LEDGER NO.....
WORK SECURED BY.....HOW BILL.....
.....
.....
BILLED DATE.....MATERIAL DELIVERED.....

Fig. 8.—Material Voucher.

NOTE: THIS SLIP MUST BE SENT TO OFFICE AT CLOSE OF EACH DAY (OTHERWISE NO PAY).

DATE RECEIVED.....

NAME.....

ADDRESS.....

WORK.....
.....
.....

MECHANICS' REPORT: (A COMPLETE AND DETAILED ACCOUNT OF WORK DONE ON THIS JOB MUST BE MADE OUT HERE. GET RECEIPT FOR ALL MATERIAL OR TOOLS RETURNED TO SHOP).

.....
.....
.....
.....

SIGNED.....

NAME	HOURS	WAGES PER HOUR	AMOUNT	EXPENSES	AMOUNT
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

VOUCHER.

I HEREBY CERTIFY THAT THE WORK IN ABOVE PREMISES WAS SATISFACTORILY DONE THIS DAY.

.....
(SIGNATURE OF OWNER OR TENANT)

DATE OF WORK.....

Fig. 9.—Daily Time Voucher.

Duty to Maintain Premises in a Reasonably Safe Condition.

A merchant who invites customers into his establishment, the Supreme Court of Kansas says, is bound to maintain his premises in a reasonably safe condition, and he is liable to those who without their own fault are injured by his failure to so maintain them. If there is a dangerous place on his premises, he must safeguard those who come lawfully thereon by proper warning and otherwise. True it is that mature and normal persons must exercise their faculties for their own protection, but where they are lulled into security by the acts of one on whose premises they are lawfully present, they cannot, in all cases, be said to be guilty of negligence when an accident overtakes them. In the case of Reese vs. Abeles, 164 Pacific Reporter, 1080, the plaintiff was present in the defendant's store as a customer. Her attention was attracted to some goods on the shelves, and she talked with the defendant about them. He said: "Just step around there and look, and you may find what you want back there; if you do, pick it out and I will make the price right." The place indicated was dark, owing to stacks of goods nearby. As the plaintiff walked in the direction indicated, she fell through an open stairway in the floor, partially obscured by the darkness, and was injured. It is held that, under the circumstances, the plaintiff was not guilty of contributory negligence, and that the defendant was negligent in failing to warn the plaintiff of the presence of the open stairway.

IN ANCIENT DAYS *when* PLUMBERS POSSESSED COATS *of* ARMS

Craftsman of Middle Ages Proudly Announced His Calling, Using Armorial Bearings Which Were Artistic Creations

By Wallace H. Bancroft

THE plumber of "ye days of olde when knights were bolde"—back in the fifteenth and sixteenth centuries, was in some parts of Europe, particularly in England, held in more than ordinary esteem by the public at large.

The plumber in those days was not considered a subject for jesting by the humorists. No one thought of calling him an extortionist or a grafter. In fact, the public stood in a kind of awe of him and his work, for the worker in lead was deemed an artisan of considerable importance in the British Isles in the Middle Ages.

The plumbers or workers in lead along with other craftsmen, such as the iron mongers, pewterers, glaziers, etc., fully realized the value of their services to the country and to the extent that they organized themselves into guilds, companies or incorporated societies, and were granted charters by the crown. The plumbers are known to have adopted coats of arms or armorial bearings, emblematic of their calling, which were displayed in their meeting places or carried in the processions of different trade guilds, set aside for certain days in the year.

There are some London master plumbers, who to this day are using these ancient armorial bearings upon their business stationery or for advertising purposes. Hence when my lord or lady of the manor receives the bill for sanitary services rendered, his lordship, or her ladyship, will be inclined to accord more than common respect to the document, owing to the monarchial appearance of the thing. At a later period—in the 17th century, we hear of the plumber being referred to as "worshipful," as for instance the Worshipful Company of Plumbers of London.

The plumber in the middle ages was a man of the artistic temperament. He executed or carved out in lead the designs drawn by the mediaeval architects. In those days—the grand period of mediaeval art—the beauty of the plumber's scroll work in lead was notable. He also executed designs in connection with lead water leaders. Expansion joints were made without the use of solder, the edges of sheets of lead being bent up and covered so as to make these joints waterproof.

The plumber of that period was more of an artist than a sanitary engineer, for it is recorded that cities like London and Paris were dirty places in the extreme, the streets being very foul, more so than most sewers. These streets were the dumping ground for household refuse, the people being ignorant of the existence of bacteria or the principles of sanitation. They would dispose of refuse by emptying it by the pailful out of their windows into the street. It is recorded that people of religious inclinations would pray for deliverance from sickness and death, but would forget their garbage heaps, foul streets and dirty homes.

Irish Jesting About Plumber.

The Worshipful Company of Plumbers of London appears to have been the subject of jesting in an editorial vein in 1874. Prior to that time it seems that the craft in England and elsewhere had not become the common prey of the jokesmith's genius, although there were no doubt many instances, where the budding comic writer made literary food of the plumber among other craftsmen. In 1874 an Irish editor, named Maguire, who published a penny paper in Dublin, had occasion to attend a banquet of the Worshipful Company of Plumbers in London. His report of the festive event was characterized by typical Irish wit. He wrote: "Plumbers are condemned on every pretence for having done what they ought not to have done, and also for not having done what they ought to have done. But it is not only outsiders who call them hard names; they positively seem to rejoice in 'raking themselves o'er the coals.' I never heard such hard things said of plumbers as I listened to at the recent banquet of the Worshipful Company of Plumbers in London. The speakers not only abused them and their craft, and recommended reform on all sides, but they were applauded by the Worshipful Company to the echo. They recall to my mind, Daniel O'Connell's famous address to a crowded assembly of his admirers in Tipperary, in which he concluded in these terms: 'Me brave counthrymin, aren't we all discinded from the ould Irish Kings?' and his audience cheered and shouted in hearty response, 'We are, we are, we are!' 'Aren't we all the thrue Milesian sons?' 'We are, we are, we are!' 'They call us a nation of blackguards, are we that?' 'We are, we are, we are!'"

The Ancient Plumber's Coat-of-Arms

An ancient book, treating on the activities of various crafts in the middle ages in England, was published in 1824 in the Tyneside town by James Walker and A. M. Richardson. This antiquated volume is entitled, "The Armorial Bearings of the Several Incorporated Societies of New Castle on Tyne." The book speaks of the Merchant-Adventurers, an organization of mercers, drapers and boothmen. Their charter was granted them in 1215 A. D., by King John, who was made a kind of honorary member. Similar organizations which were known as companies grew up in New Castle, representing different trades, some

coupled or grouped into one company. Each had its own coat-of-arms. The bakers and the brewers were joined in one company, and the armourers went in with the feltmakers and the curriers. The plumbers, pewterers, and glaziers were commanded by the ordinary of their company, dated September 1, 1536, "to go together on the Feast of Corpus Christi and maintain their play of the "Three Kings of Coleyn." The due performance every year of a miracle play appears to have been a duty strictly imposed on the members of nearly all the trade organizations.

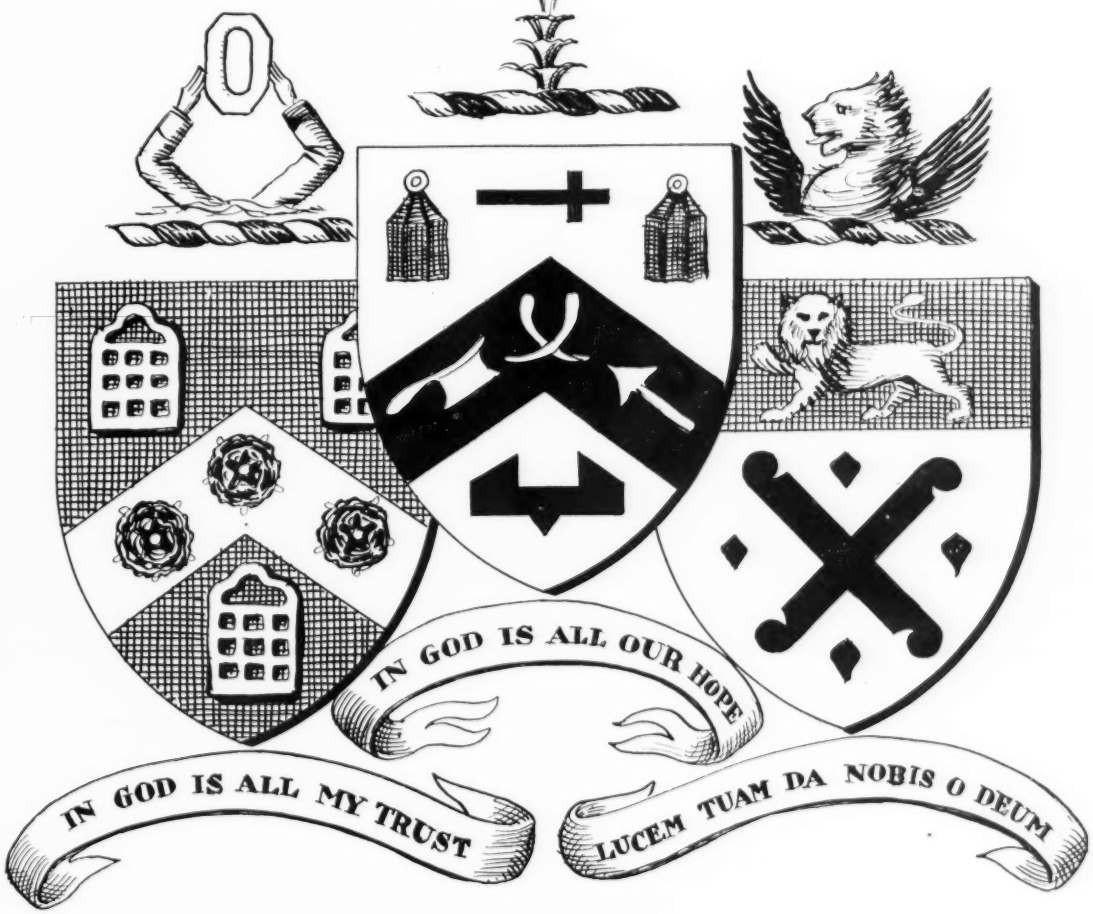
The book speaks of the rules of the Plumbers and Pewterers. It was provided that "no Scotsman born should be taken apprentice or suffered to work in Newcastle on pain of forfeiting 3s 4d." The Company of Plumbers, Pewterers and Glaziers built themselves a hall in 1619, and at a later date they hung out a gilded ball which was believed to have been shot from a Scot's cannon during the seige of the town in 1644. This ball was found lodged in the wall when some alterations were made, and it may be regarded as a symbol of the hatred of the Scots that existed in the English border countries.

Keeping the Apprentice in Check

There were numerous rules made and enforced to maintain orders among the apprentices to plumbers, pewterers and glaziers, who served from five to as much as ten years before they received their indentures or were considered competent to work as skilled artisans.

In 1514 the Merchants Adventurers secured the passage of an act to govern any apprentice who was guilty of excesses in conduct and apparel. A master in any of the trades was prohibited from taking apprentices born in Tyndale, Riddlesdale or similar towns, because the young men there brought up were known either by education or nature not to be of honest conversation, and according to the letter of the Act: "What forsooth can you expect of youths proceeding from such lewd and wicked surroundings." Speaking of the excesses in the conduct and dress of some apprentices, the Act reads in part:

(Continued on Page 488.)



PLUMBERS, PEWTERERS & GLAZIERS

Coat-of-Arms of the Plumbers, Pewterers & Glaziers' Companies of Newcastle-on-Tyne.

SEPTIC SEWAGE TANKS *of* TILE PIPE

Design and Construction of Septic Tanks from Tile Pipes Is Plumbers' Work

By John H. Perry

WE HAVE received several inquiries from plumbers at different times which lead us to believe that tile pipes of large sizes are coming into their own for septic tank construction. And in the belief that an article on the subject at present will help many plumbers to design and construct septic tanks of this material, we present the following brief treatise.

The fundamental principles underlying the theory of septic tanks, and their construction is, of course, the first subject to be studied. There is no use of just diving into the thing haphazard, as failure is sure to be the result.

Many things must be considered, and many things must be guarded against, in order to obtain final success.

Let us look at the subject broadly. Let us first examine sewage and see what it is, and what we have to do with it.

Sewage is a composition of various substances. Most of it is water. Some of it is in solid form heavier than water. Some is in solid form lighter than water, and some is in solution in the water. These are the substances which we must handle in a physical way. But in addition to them there is something else, something very important, that must be considered from another standpoint. It is the bacterial contents of the sewage.

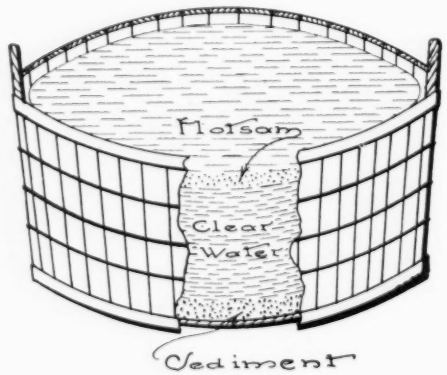


Fig. 1.

What a plumber has to do with sewage is, first, to remove it from the buildings with pipes, or sewers. If it cannot be discharged into city sewers or other safe places of direct disposal, he must make provision for its proper treatment and final disposition.

To do this in accordance with modern ideas of sanitation he must remove a large percentage of the solids from the liquids. Then he must provide for the liquids to leave the solid intercepting apparatus in a reasonably clear condition. And if the means of final disposal warrant it, he must provide an apparatus to filter or sterilize or otherwise make harmless the bacteria which leave the intercepting tank with the liquid.

These, broadly speaking, are the essential requirements of sewage treatment. Plumbers must face them at times.

"But how can the solid matter be separated from the liquid matter?" you ask.

It can be done in different ways, and quite easily. It can be separated by centrifugal action, like cream from milk, although that is not a practical plan. It can be separated by filtration, like muddy street water through filters in a building, but that too is far from being a practical plan.

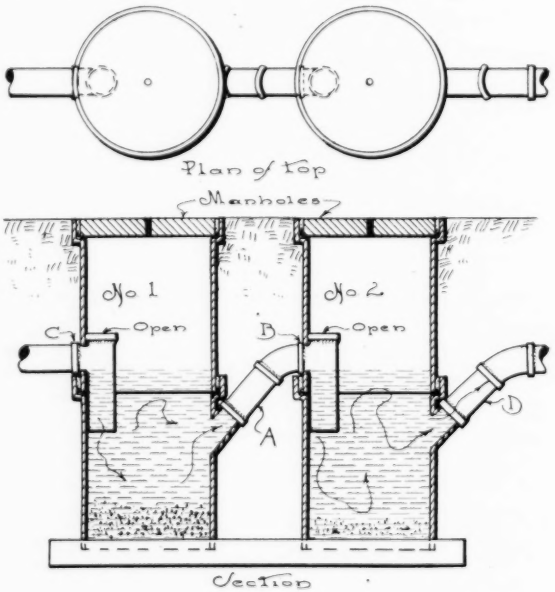


Fig. 2.

The practical plan is plain sedimentation. That means allowing the sewage to stand in a quiet pool for a certain length of time, then drawing off the clear water, leaving the solid matter in the pool. Sedimentation is the first, and probably the most important, step to be taken.

Suppose you take a wash tub, and fill it with muddy

water that runs along the gutters of a dirt road during a heavy rain. Let it be real muddy water. Let that water stand in the tub unmolested for say 24 hours. Then examine it. You will probably find that the tub contents are now separated into three strata or layers as in Fig. 1. On top will be a layer or scum of "flotsam." This is solid matter which is lighter than water and naturally rises to the surface. At the bottom is a layer of sediment and mud, which being heavier than water has settled on the bottom. But in the middle of the tub is a depth of comparatively clear water, and practically free from solid matter.

The contents of this tub is composed of nothing but pure clear rain water plus dirt from the road. While it was agitated it was in a muddy condition. If the muddy water had been frequently stirred up while in the tub, it would have remained muddy. But being allowed to remain still a sedimentation took place and the contents separated as shown in Fig. 1.

This is exactly what happens in all liquids which have different specific gravities. It takes place in a bottle of milk, if you let it stand for some time. The cream goes to the top. Dirt in the milk settles at the bottom, and plain skim milk stays under the cream. Shake the bottle and cream, milk and dirt, if any, become all mixed up again.

In the case of the tub, Fig. 1, stir up, or in any way agitate the water severely, then mud, flotsam and clear water will all mix together again, resulting in a completely muddy whole.

Quiescence is essential to proper sedimentation. Remember that.

Another important factor in correct sedimentation is time. Sedimentation is a very slow process. You will find that to be true if you stand and watch a tub of muddy water clearing up. It cannot be hurried. It just takes its own time.

The time required for sedimentation depends upon the density and size of the particles to be settled down. The heavier and the larger particles settle first. The lighter and the smaller particles settle last. And flocculent material, whose weight is exactly equal to that of water, or is so nearly equal to it that the viscosity of the water overcomes the slight difference in density, just stays mixed with the water, unless chemicals are used to precipitate it.

Now we know the fundamental principles of sedimentation. Let us see how they can be applied in practice, using ordinary tile pipe in our construction.

Experience combined with many tests and experiments have proved that the longer the water stays in a sedimentation chamber, and the quieter the water, the more will the solids settle. This means that the settling chamber of a septic tank must have a certain capacity to insure reasonably good results in sedimentation, also that the shape must be such as to insure a very low velocity of flow.

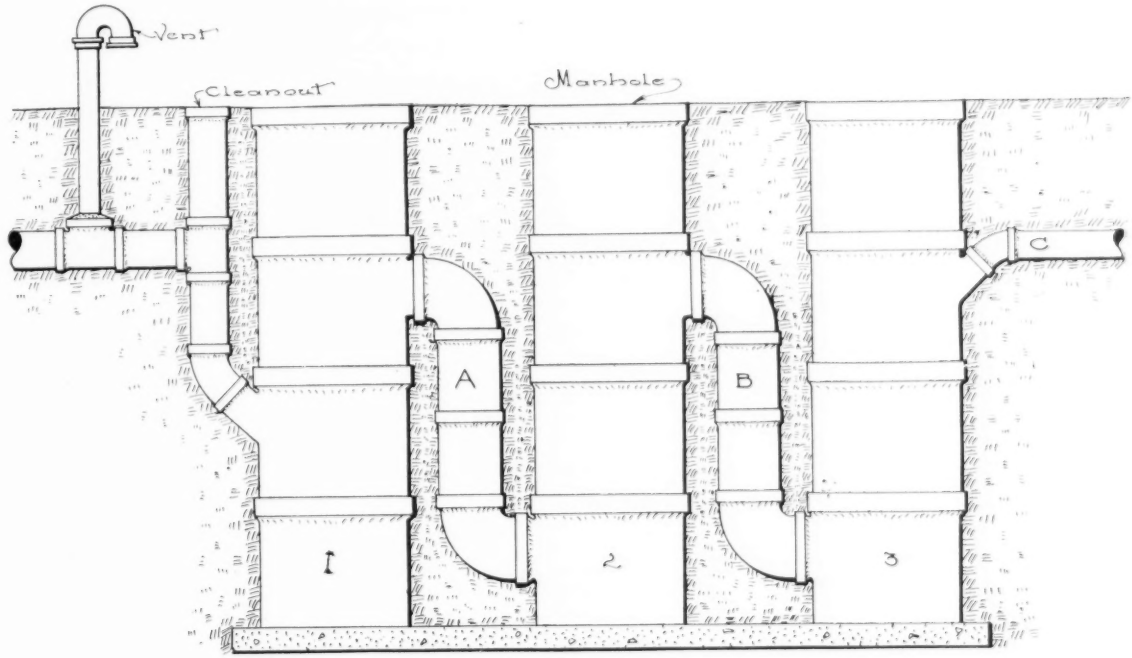


Fig. 3.

If these points are not attended to, an excess of solid matter will flow through with the water.

Here again we have to refer to the past experience of engineers, both as to practical results in installation, and to records of tests.

In ordinary septic tanks we find that a retention of 10 to 24 hours is generally allowed.

Ordinarily this means a very low velocity of flow, possibly about 5 to 10 feet per 24 hours for domestic work. Such a low velocity may be considered practical quiescence. It cannot be measured by an instrument. It can only be determined by calculation, comparing sectional area of chamber with volume of sewage.

It is recorded as a fact, however, that a shorter period of detention and a very much higher rate of velocity will accomplish quite satisfactory results.

While engineers went by the aforesaid detention and velocity rates, it was necessary to make the septic tanks of concrete, brick or other materials suited to large chamber construction.

By reducing time of detention, however, and increas-

ing velocity rates, it becomes possible for plumbers to use tile pipes in the construction of domestic septic tanks.

It is stated by civil and sanitary engineers that a sedimentation period of 1 to 3 hours in many cases removes a reasonable quantity of the solid matter. It also permits the sewage water to leave the tanks with a smaller bacterial charge. And the velocity being increased to say 200 feet per hour or less, still allows proper sedimentation to occur.

Suppose a tile pipe septic tank of the flow through type is to be designed, and suppose we consider 3 hours detention with 200 feet or less velocity per hour, let us see how a tile pipe septic tank may be built to meet these requirements. Suppose there are 10 people to be served. They use 500 gallons of water in 24 hours. But the plumbing is arranged so that bath, lavatory, sink and laundry wastes go to disposal field direct. They do not go through septic tank, which receives only closet discharge.

This means that probably only 250 gallons of sewage per day, or less, will go through septic tank.

One hundred gallons of this may go through in 3 hours. Thus capacity of tank would be only 100 gallons plus space for sludge, which would be about 8 cu. ft., if sludge is removed every spring and fall. This sludge space is figured on records which show that domestic sewage contains about 2.5 cu. yds. sludge per 1,000,000 gallons of sewage.

The space occupied by 100 gallons of sewage is about 13.4 cu. ft. The water capacity of septic tank therefore should be about 22 cu. ft.

The sectional area of a 30-inch tile pipe is about 4.9 sq. ft.—call it 5 sq. ft. Two such pipes, each 3 feet long, contain 30 cu. ft. This allows 8 cu. ft. for space within pipes not occupied by water.

Now the question arises, how can these two pipes be arranged so as to obtain the desired results, that is, to separate the solid matter from the liquid matter in a safe and suitable manner?

Fig 2 shows a simple plan that seems to work well. It comprises two 3 feet lengths of 30-inch tile pipe each with a 6-inch spur, or branch, on angle of 45 degrees. These are set on a concrete bed and cemented watertight at bottom. They are joined by 6-inch cross pipe at A, a hole being cut through the 30-inch pipe to receive hub of the 6-inch tile tee B.

On top of these 30-inch pipes are set two plain lengths of 30-inch pipe to extend them up to grade level. On top of each 30-inch pipe at grade line is a manhole cover of wood, iron, stone or concrete.

Another 6-inch tile tee is inserted at C through a hole cut in the 30-inch pipe. The hub joints of 30-inch pipe, the holes for tees B and C, and all joints, are cemented water-tight.

The operation of this tank is as follows: Sewage from closets enters chamber No. 1 from house through tee C. The larger and heavier solids fall to bottom of this chamber. Light material floats on top. Water with a considerable quantity of solid matter in suspension flows up A, through B and into chamber No. 2, as shown by arrows. There it stays some time, and more solid matter settles from the water. Finally it leaves chamber No. 2 through the Y branch and goes to sewer, disposal field, or filter.

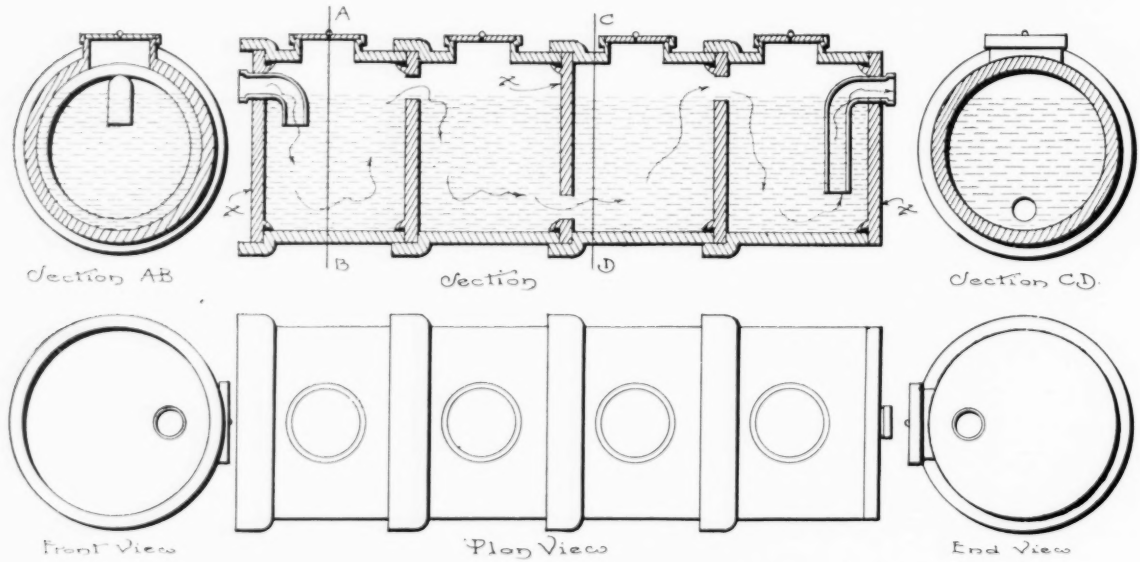


Fig. 4.

This arrangement will extract most of the solids from the sewage; because the water stays about 3 hours in the chamber, which is considered time enough for the solids to settle, because the sectional area is large and average velocity of flow not more than 2 or 3 feet per hour, and because the inlet and outlet connections are arranged to present a direct through flow, or an undue disturbance in either chamber.

In plain words, the water in both chambers will be quiet and still nearly all the time. This quietness of the water permits the sludge to settle nicely and insures a comparatively free-from-solid-matter effluent through pipe D.

Now let us take the case of a septic tank for say 200 to 300 people. Let us assume the same conditions of discharge, that is, about 25 gallons per person per day. That makes the tank about 30 times larger than the one shown in Fig. 2, if we base it on the same factors. If such a large tank has to be made of tile pipe we must work on a close margin, otherwise we will be beyond practical limits.

Let the retention period be 2 hours.

Let the total quantity of sewage to be handled be 7,500 gallons per day.

Suppose it all goes through in 7½ hours, or its maximum flow being equivalent to that. Then the maximum amount of sewage to be treated per hour is 1,000 gallons, or 2,000 gallons on a 2-hour retention basis. This then is the liquid contents of septic tank.

Suppose we intend to use 42-inch pipes each 3 feet long.

The sectional area of such pipe is about 9.6 sq. ft.

The space occupied by 2,000 gallons is about 267 cu. ft. Dividing this by 9.6 we find the total length of 42-inch pipe required to hold the 2,000 gallons, which is 27 ft. nearly. Now the question is how to work in 9 lengths of 42-inch pipe so as to make a good septic tank out of them.

Possibly the plan shown in Fig. 3 is as good as can be worked up.

The tank consists of three chambers, 1, 2 and 3, connected together with say 18-inch pipes. The inlet perhaps is 10 or 12-inch. The outlet may be 8 or 10-inch. The chambers are composed of 4 lengths of 42-inch pipe with cemented joints and set on a concrete slab, all made water-tight. Each chamber has a manhole cover. The inlet pipe extends up to surface of ground with a 6-inch brass screw cap clean-out. On the house sewer is a fresh air inlet or air relief pipe with return bend to prevent sewer air binding.

The majority of sludge settles in bottom of chamber No. 1. The water is drawn from No. 1, at a point, say, one foot below the surface, which is below the scum that surely will gather there. It then descends in 18-inch pipe A, and enters about 2 feet above bottom of chamber No. 2. Then it rises slowly in No. 2, depositing considerable solid matter to bottom of No. 2. Then it leaves No. 2 through 18-inch pipe B and enters chamber No. 3 near bottom. It then ascends No. 3 and in ascending it deposits the remainder of its solid matter, at least to a reasonable extent. Then it flows to place of disposal through effluent pipe C.

The mean velocity throughout is about 13 feet per hour which is well within the limits of good engineering practice. Therefore this tank ought to give excellent results.

Not only is it a good settling tank, but it is easy to build and easy to clean.

Now we come to a patented tank of tile pipe, one that

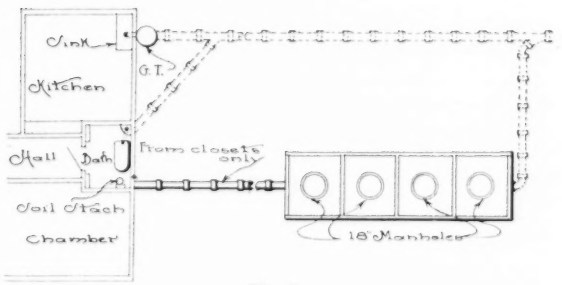


Fig. 5.

plumbers can buy and put together. It is furnished in sections, and as many sections are used as are necessary to take care of the job. Such a tank is shown in Fig. 4 by plan, longitudinal section, cross sections, and end elevations.

The drawing speaks for itself.

The principal thing that plumbers have to buy from the maker is the partition walls. Five of them are used in Fig. 4, and they are all the same.

Each partition is a flat round disc of vitreous ware with a hole in it near the circumference. In setting the partitions either between the big T chambers, or as end pieces, the openings are arranged to secure an up and down flow of sewage through the tank, as shown by arrows. The manholes on top are for removing the sludge which gathers at the bottom of each chamber.

The chamber nearest the inlet of course gathers most of the sludge, then the next, and so on, the one at the outlet gathering the least.

As previously stated, it is intended to discharge closets

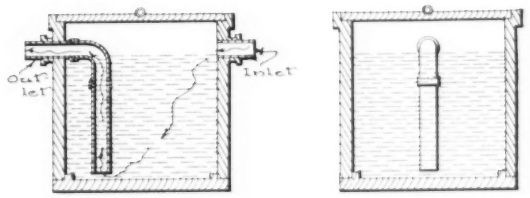


Fig. 6.

only into the tile pipe septic tanks. In such a case the piping at building and tanks would be connected something like Fig. 5, which shows the bath basin and sink wastes going direct to place of disposal.

The outlet of septic tank discharges into the clean water waste line.

But in this work it is necessary to pass all such waste water through a grease trap to intercept all grease. The location of grease trap is shown at G. T. in Fig. 5. Its construction in tile pipe form is shown in detail in Fig. 6.

The same size tile pipe may be used here as is used in septic tank. It must be water-tight and provided with a cover. The inlet enters at top. The outlet leaves at bottom. This chills the grease which gathers at the surface and can easily be removed when cover is lifted off.

Gas attacks are not to be feared by soldiers at the front only. In Chicago, in the course of the Second Liberty Loan drive, for instance:

A. Happer, a Liberty Bond salesman, went into a dentist's office, where a big man lay inert in the operating chair. The dentist was working over the patient feverishly.

"What's the—," began Happer.

"Can't get him out—can't get him out of it," gasped the dentist. "Gas, you know—gas. He won't come out of it. Here, lend a hand and help bring him to. Take his arms—this way. Come on!"

"Righto!" cried Happer. "But if I bring him out, will you buy a Liberty Bond?"

The dentist would have promised to do much more than that. In a minute the patient began to show signs of life. He gasped, shivered, and at last sat up.

"Where am I?" asked the patient.

"Excuse us," said Happer. "We just waked you up to sell you a Liberty Bond."

Twenty minutes later Happer left the office with two signed applications and two checks in his pocket.

"Everybody who isn't unconscious is buying a Liberty Bond," said Happer, when he related the story.

It ain't the guns nor armament, nor fund that they can pay,
But the close co-operation that makes them win the day.
It ain't the individual nor the army as a whole,
But the everlastin' team work of every bloomin' soul.
—Rudyard Kipling.

HAVE FAITH *in* YOURSELF

By R. E. Dockham

R. E. Dockham.

AGAIN the seasons have made their rounds, and we stand upon the threshold of a new twelve months of opportunity and endeavor.

Perhaps New Year's resolutions have no place in your thought; nevertheless, the beginning of a new year is an event that bids us pause for the moment, for old things are passed away, and before us all is new. We are prone to look forward with hope to the opening of our spring business and our summer and fall activities.

So while we mark time before the command "forward" is given, let us talk a little of our hopes and purposes for the days ahead.

Brother Plumbers and Fitters throughout this great land, I greet you and bring you this message "Have Faith in Yourselves."

I hear some one ask "what manner of man is this?" and I answer, I am wedded to the plumbing trade in its entirety through the rite of apprenticeship and years of toil. Is there a plumber in disgrace? I share it. Is there an antipathy toward the craft? It is directed toward me; moreover, I speak or write not only from *experience* but from aspirations and hopes.

It's strange how some words haunt us—some simple phrase or sentence we have heard or read. I remember words, read while yet a boy, the books which brought them to me are forgotten, the time and place in which they were read have long since passed from my memory, but the words themselves have seemingly been engraved upon my mind in indelible letters; lectures have I listened to, with intense interest, but all save a few phrases have been forgotten.

If I have a wish concerning these few words, it is expressed in this, that some good plumber or fitter, just a man like myself, who glances through these lines, shall, when his time of stress has come, remember to his encouragement, nothing more than just the words under which I greet you, "Have Faith in Yourself."

If there is one lesson which our reading brings us, as we dwell on the lives of men, whom time has made great, it is this, that they were sufficient unto the call of opportunity and duty, who, when their call was sounded were doing,—what? Just the ordinary tasks of life.

We have, it seems, grown used to an attitude of depreciation on the part of our fellows. At the end of the day a friend and plumber, who will read these lines and smile, came out of a home, in which he had been busy, was caught by the beauty of an autumn sunset, and as he stopped to feast his eyes upon the blaze of colors a lady asked: "At what are you looking?" As he pointed to the picture in answer, she said: "I did not suppose a plumber could appreciate a sunset."

We deplore conditions which we have created. I am rebuked and refreshed on every hand if I but spend a pittance.

Do I desire shoes? Eight or more dollars is the price, and there is no apology in the storekeeper's manner or guilt in his eye, though his neighbor may display shoes for five.

That is his price, and if I buy, I am conscious that he has gained. In my heart I do him homage, he is a man, who stands upon his own feet.

What then should I wish for the days before?

I would that every member of our trade should act so that he would honestly believe in himself, for know this, I am the one who fixes my own standing in the public eye, and my estimate of my own value is a gauge for all men's appraisement.

As opportunity offers, in our intercourse with our fellows, I would that we honestly and earnestly, as becomes men, who strive to be something of worth and value, might work to create in their minds a feeling of respect and appreciation for our craft.

For know this, doubter, who would scoff at any small attempt on our part to reform public opinion, since time began no good work or reform has ever been, that did not first exist in the mind of one man.

I would do away with false standards, which belittle us to ourselves. Why should I honor the physician, as here and there he brings relief from sickness when over this great land my fellow craftsmen ensure to millions *freedom* from sickness.

Why should I thrill when I read of great gifts from philanthropists heralded from shore to shore. My contemporaries, for a generation, have given *without profit*, comfort, health and convenience to humanity, unheralded and unsung.

I would have all our master craftsman endowed with a renewed sense of common honesty in its larger sense. I would have them honest with the customer, with the dealer and most of all honest with themselves.

If we are dishonest with ourselves, many suffer.

In every business transaction I would that our minds be at rest through the complete realization of the fact, that exchange is best where *each* one receives the greatest benefit.

In short, I say give to yourself a square deal, for how shall a man respect himself when he is conscious of wrong within, even though it be toward himself.

Finally then, be strong to master your own problems, for "the power which resides in you is new in nature" and no one can do your work but you, look only to yourself for you are bigger than the conditions you have created Be not niggardly in your thoughts of yourself. Big men are only little men, given a fair chance to grow.

So, friends all, let us be men, big men, who stand upright and who shall command the respect of our fellows. In prosperity be big, in adversity be not apologetic, if it be that you have done your best. Seek not sympathy, for it seems to be true that that thing which cannot protect itself shall not stand.

So shall we look all men in the face in good fortune or bad, with a bearing which shall speak as plainly as words:

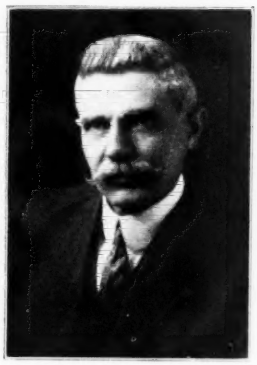
Give me not pity or praise, but help me to be a man, to have Faith in Myself.

CO-OPERATION, *the* ROAD *to* PROSPERITY

A Serious Appeal to the Master Plumbers of the Country

By L. McNamara, of St. Louis, Mo.

President of the National Association of Master Plumbers.



L. McNamara.

SINCE this is the time of the year when we extend greetings of good cheer, I desire to extend to the trade throughout the country my sincere good wishes for a Merry Christmas and a Happy and Prosperous New Year.

Whilst I am not a pessimist, but, on the contrary, hold very optimistic views, still, on account of the World War, I cannot foresee anything that will assure us of a prosperous 1918.

Conservation is being preached on all sides, therefore, on account of the great falling off in business, it is absolutely necessary for plumbers in various sections of the country to cooperate to conserve their business. My suggestion of cooperation does not mean combination, but to advance your best efforts to educate one another to the needs of the hour, that is: Provide for the necessary costs that enter into our line.

Do not condemn a man who takes a contract below cost, but get into his confidence, show him the error of his way, point out his errors so that he will not make the same mistake on the next transaction. That is what I mean by cooperation.

Conditions have changed greatly since our entry into the war, and while there is an apparent wave of prosperity, it is only enjoyed by those who are engaged in the manufacture of munitions and various items necessary to equip a large army. The demand for metals, etc., has increased the cost of building materials to such an extent that there is practically no building operations in progress, and as a consequence our business has fallen off 50 per cent; this means that your percentage of operating has been increased to a marked degree, as reduced volume means increased costs. Many men in our line have not changed their methods to meet the changed conditions, although they have a daily object lesson that brings this point out very forcibly. In other lines, when there is a lack of business, they increase their prices to take care of the increased overhead expense occasioned through the lack of volume. Not so with the plumber. It has been his custom to reduce the price. You cannot accomplish impossibilities because, if costs are increased, you must provide for them. Cooperation is necessary to overcome this condition. Do not treat your competitor as an enemy, but rather go to him as a friend. Don't ridicule him, but encourage him by pointing out his faults, so that he will gain knowledge and improve the next time. We must conduct our business along the same lines as the manufacturers. They educate one another on Costs. That is the reason why there is only a slight variation in price on the estimates they furnish. There should not be any more than a 5 per cent variation in bids submitted on a plumbing transaction, since the material and labor generally costs us the same. Yet what do you find? Bids varying from 12 to 50 per cent. This condition is radically wrong and proves conclusively that we do not know our costs. Some people will argue that they have no overhead expense. This is rediculous. Even if you have no store and conduct your business from your home, you have an overhead expense, and it amounts to a great deal more than you imagine and provide for.

I am alarmed at the reports I have received of the number of plumbers going into bankruptcy. There is a cause for this. These firms did not know what their cost was. It has been stated in Court that a firm is bankrupt when it does not pay a 6 per cent return on the capital invested over the cost of operating. How many firms are bankrupt but do not know it? The truth hurts at times, but we should learn it. If you feel ill, you call a doctor, and he prescribes something to cure your illness. It might be that your business is sick, hence, it would be well for each and every one of us to look into our affairs closely, and if we are bankrupt, according to the foregoing rule, even though we have not been forced into it and adjudged so by the Court, prescribe a method that will bring about a healthy condition of business, i. e., make your business yield at least a 6 per cent return on the capital invested, over and above the cost of operating. If you do not know how to ascertain whether or not your business is profitable, ask some member of the craft, who does know, and he will gladly put you on the right track, since it is for the general good of the trade for all engaged in business to know how to provide for the costs and make a profit.

I presume some of the members of the craft will think this frank statement a little harsh coming at this time of the year, but I feel it is necessary to bring the members of the trade throughout the country to a realization of their duty to one another, and I, therefore, trust that all will cooperate for each other's good, and, if this is done, my wish, that each of you will enjoy a prosperous New Year, will be realized.

Hoping to have the pleasure of meeting each member personally at the re-union of the members of the trade, which will take place in St. Louis in June 1918, I remain,

Sincerely yours,

L. McNAMARA, President,
National Association of Master Plumbers of the United States.

Court Decisions On Labor Questions.

An unusual array of important decisions is presented by the Bureau of Labor statistics of the United States Department of Labor in its annual compilation of court decisions on labor questions, just published as Bulletin No. 224. A number of the decisions of the Supreme Court of the United States, handed down since December, 1916, are included in this bulletin, but for the most part the decisions were made in the calendar year 1916.

Most notable among the supreme court decisions, on account of the circumstances attending the enactment of the law construed by it, is the decision sustaining the constitutionality of the Adamson 8-hour law for trainmen in interstate commerce, and declaring at the same time the right of Congress to compulsorily arbitrate disputes between the railroads and their employes for the benefit of the public.

The first broad decisions ultimately deciding the constitutionality of workmen's compensation laws are also noted in this volume. Although a number of state courts of last resort had passed upon laws of this type, it was not until the Supreme Court of the United States had given the seal of its approval that the matter could be considered as finally settled. In upholding the compulsory compensation law of New York and of Washington, the latter also providing for a compulsory state insurance fund, the farthest reach of compensation legislation has received judicial approval. The elective law of Iowa was likewise sustained.

Another important decision by this highest court was that sustaining the Oregon 10-hour day for factory employes without regard to sex or age, a marked reversal of position from the action of the same court in 1905 in holding the 10-hour law of New York applicable to bakeries unconstitutional; the power of the state to enact laws limiting the hours of service of adult males in private employment, as well as the hours of females and of children, is now recognized. The fixing of wages for women and minors under eighteen is also a valid exercise of the police power according to another decision of this court, the Oregon minimum wage law being left undisturbed in its position of constitutionality as determined by the supreme court of that state; on this point the federal supreme bench was equally divided, one justice not voting.

Of hardly less interest than these decisions of the supreme court is the action of the court of last resort of the state of Massachusetts in declaring unconstitutional an act of that state which undertook to limit the issue of injunctions in labor disputes, declaring that injunctions should be issued only when property rights are affected, and that labor is not property. The court took the view that this attitude excludes from the protection of the law those who had no other property than their right to work, and held that such a deprivation could not be effected by statute.

Besides the decisions of the supreme court on the subject of workmen's compensation, the bulletin contains numerous decisions and rulings by the state courts, questions of construction and constitutionality being involved. The Kentucky Court of Appeals, which had declared unconstitutional the workmen's compensation law of 1914, found the enactment of 1916 conformable to the tests of validity established by it; while the supreme court of Texas sustained the compensation law of that state in all points as against an opinion of a subordinate court that the provision was void which took from employes of accepting employers their option to accept or reject the act.

The point that continues and apparently will continue to furnish the greatest number of cases for determination is found in the phrase which appears in most of the compensation laws—"injury arising out of and in the course of employment." In the state of Washington, however, the law does not contain the limitation, "arising out of employment," so that discussion of this point is avoided, the supreme court of the state saying that the employe "is the soldier of organized industry, accepting a kind of pension in exchange for absolute insurance on his master's premises."

No less prolific of litigation is the federal liability law covering railroads in interstate commerce, since not only must the employing company be an interstate carrier, but the injured person must at the time of his injury have been employed in interstate commerce; it is only when he is so employed that he can claim the benefits of the act, while, on the other hand, if so employed he is restricted to such recovery as that statute provides. With the wide extension of compensation legislation (now found in 37 states), there is constant contrast, not to say conflict, between the two classes of remedy, that is, by compensation and by suits for damages; furthermore, as appears from a number of the cases discussed in this bulletin, it is frequently a practical impossibility to determine whether relief should be sought under the one law or under the other until the evidence has been submitted to a jury and a verdict rendered. While therefore such a compilation of decisions, selected for their particular interest as illustrating the various legal phases of the labor question, possesses an attraction for every employer of labor, it is of especial value as indicating those points in our legislative system which require attention, to the end that more certain and prompt adjustments may be made of the rights of the respective parties to labor contracts. At the same time, certain boundaries are indicated which cannot be passed without an alteration of constitutions, or at least of views of constitutional interpretation. Evidence is not lacking of changes in both these respects.

Signatures or Names Not Always Controlling.

The signatures or names affixed to an instrument do not always control in determining whether the instrument is that of the corporation indicated, or that of the person who signed the names. Neither do the words "by" and "as" preceding or following the name of the corporation, or that of the individual or officer signing or writing such name, always control in determining by whom the given instrument is executed and who is bound thereby.—Supreme Court of Alabama in Bank of Tallassee et al. vs. Jordan, 74 Southern Reporter, 936.

Accuracy.

"I am delighted to meet you," said the father of the college student, shaking hands warmly with the professor. "My son took algebra from you last year, you know."

"Pardon me," said the professor, "he was exposed to it, but he did not take it."—"Christian Register."

Familiar Faces Among the Who

The "Key" to These Pictures Will Be

holesalers and Manufacturers

Will Be Found on Pages 461 and 462.

FAMILIAR FACES AMONG *the* WHOLESALERS *and* MANUFACTURERS

Key to Group Pictures on Preceding Pages

1.—John R. Steneck, Sales Manager and Director, Illinois Malleable Iron Co., Chicago.
3.—John C. Jamieson, Sales Manager, The Geo. J. Roberts Sanitary Mfg. Co., Pittsburgh, Pa.
3.—John C. Jamison, Sales Manager, The Geo. J. Roberts Co., Dayton, O.
4.—L. O. Koven, President, L. O. Koven & Bro., New York City.
5.—H. C. Tabler, Secretary and Treasurer, D. & T. Mfg. Co., St. Louis, Mo.
6.—John Kelly, Head Designer for the Thomas Maddock's Sons Co., Trenton, N. J.
7.—C. D. Parmelee, Representative of The Fairbanks Co., New Orleans, La.
8.—W. E. Wells, Vice President and Sales Manager, Bay Ridge Specialty Co., Inc., Brooklyn, N. Y.
9.—Charley Long, Representative for Bailey-Farrell Mfg. Co., Pittsburgh, Pa.
10.—Frank Van Inwagen, Vice President and Sales Manager, Illinois Engineering Co., Chicago.
11.—C. D. "Boots" Little, Assistant Secretary, Crane Co., Chicago.
12.—Philip Haas, President, Philip Haas Co., Dayton, O.
13.—Lou Brennan, President, Victor Brass Mfg. Co., Cleveland, O.
14.—Frank Fife, General Manager, Canton Supply Co., Canton, O.
15.—C. G. Podley, Boston Representative, The Beaton & Corbin Manufacturing Co., Southington, Conn.
16.—A. C. Brown, President, The Chicago Faucet Co., Chicago.
27.—C. K. Foster, Vice-President, American Radiator Co., Mich.
18.—R. R. Rabe, General Sales Manager, Foundry Department, The Casey-Hedges Co., Chattanooga, Tenn.
19.—Robert Savill, Sales Manager, Thomas Savill's Sons, Philadelphia, Pa.
20.—H. C. Cornelius, Secretary and Treasurer, Wolverine Brass Works, Grand Rapids, Mich.
21.—John Hartman, President, Hartman Ingot Metal Co., Chicago.
22.—Harry Snow, Representative for Peerless Selling Co., Evansville, Ind.
23.—F. Lautenschlager, Manager Promotion Department, Kroeschell Bros. Co., Chicago.
24.—George J. Debn, President and General Manager, Compound Injector & Specialty Co., Chicago.
25.—Frank Uhl, Secretary and Sales Manager, Detroit Valve & Fittings Co. and Detroit Brass Works, Detroit, Mich.
26.—George H. Bailey, President, Bailey-Farrell Mfg. Co., Pittsburgh, Pa.
27.—C. K. Foster, Vice President, American Radiator Co., Chicago.
28.—W. C. Longenecker, Treasurer and Sales Manager, Toledo Pipe Threading Machine Co., Toledo, O.
29.—N. A. Harris, President and General Manager, The Lowry Co., Atlanta, Ga.
30.—G. A. Robertshaw, Sales Manager, Robertshaw Mfg Co., Youngwood, Pa.
31.—Gordon Black, Representative, Woodward-Wanger Co., Philadelphia, Pa.
32.—Lewis Phillips, Manager, Indianapolis Offce, Kohler Co., Kohler, Wis.
33.—George A. Moore, Secretary and Assistant Manager, Detroit Range Boiler Co., Detroit, Mich.
34.—J. C. Forster, Vice-President and Sales Manager Abingdon Sanitary Mfg. Co., Abingdon, Ill.
35.—Walter H. Wilson, Secretary, Minneapolis Heat Regulator Co., Minneapolis, Minn.
36.—A. F. Howe, Vice President and General Manager, The Borden Co., Warren, O.
37.—J. S. Hopkins Secretary and Treasurer, Never Split Seat Co., Evansville, Ind.
38.—A. A. Schley, Representative, Federal Radiator Co., New Castle, Pa.
39.—C. C. Choffin, Representative, Johnson Service Co., Milwaukee, Wis.
40.—L. J. Stern, Sales Manager, "X" Laboratories, Boston, Mass.
41.—A. S. Lindeblad, Representative, Hoffman Specialty Co., Chicago.
42.—Sam H. Moon, Manager, The Ahrens & Ott Division of Standard Sanitary Mfg. Co., Louisville, Ky.
43.—Harry Klein, Representative, Central Brass Mfg. Co., Cleveland, O.
44.—George G. Dyer, Trenton, N. J., Representative, National Potters' Association.
45.—L. R. Mendelson, President and Sales Manager, Hotstream Heater Co., Cleveland, O.
46.—Jack Downing, Representative, The Pfau Mfg. Co., Cincinnati, O.
47.—William B. Dale, Vice-President, Street & Kent Mfg. Co., Chicago.
48.—Ralph F. Kelley, Presdent, L. B. Brass Co., Peabody, Mass.
49.—A. D. Dennison, Manager, The A. D. Dennison Co., Cleveland, O.
50.—H. R. Redington, Representative, The National Tube Co., Pittsburgh, Pa.
51.—Francis Baker, President, George H. Tay Co., San Francisco, Cal.
52.—Chester W. Fell, Buyer for the W. A. Case & Son Mfg. Co., Buffalo, N. Y.
53.—Charles Pfau, President, The Pfau Mfg. Co., Cincinnati, O.
54.—Albert S. Frampton, Manager Chicago Office, Wheeling Steel & Iron Co., Wheeling, W. Va.
55.—H. F. Weaver, Secretary and Sales Manager, Peerless Selling Co., Evansville, Ind.
56.—H. A. Stamper, Representative, The Valle-Kimes Co., Dayton, O.
57.—C. L. Baker, President, Baker Specialty Co., Logansport, Ind.
58.—J. M. Robb, Chief Engineer, Moline Heat, Moline, Ill.
59.—Fred B. Edell, Representative, Sanitary Specialty Department of Imperial Brass Mfg. Co., Chicago.
60.—Joseph A. Vogel, President, Joseph A. Vogel Co., Wilmington, Del.
61.—J. P. Dugger, Secretary, Kewanee Boiler Co., Kewanee, Ill.
62.—F. H. Valentine, Representative, Bishop-Babcock-Becker Co., Cleveland, O.
63.—W. J. Casey, Representative, Joseph A. Vogel Co., Wilmington, Del.
64.—Adolph Mueller, President, H. Mueller Mfg. Co., Decatur, Ill.
65.—C. E. Burnett, President, The Burnett-Larsh Mfg. Co., Dayton, O.
66.—D. A. Ebinger, President, The D. A. Ebinger Sanitary Mfg. Co., Columbus, O.
67.—Joseph H. Hummell, Jr., The Eagle-Picher Lead Co., Cincinnati, O.
68.—Jack Esperon, Manager Indianapolis Office, United States Radiator Corporation, Detroit, Mich.
69.—G. P. Cartwright, Representative, Pittsburgh Valve & Fittings Co., Barberton, O.
70.—J. F. Redmon, Manager, Detroit Branch, The W. A. Case & Son Mfg. Co., Buffalo, N. Y.
71.—John L. Rice, Field Commissioner, The Sewer Pipe Manufacturers' Association, Akron, O.
72.—Paul Blatchford, Secretary, Central Supply Association, Chicago.
73.—James M. Stannard, President, Stannard Power Equipment Co., Chicago.
74.—John M. Ward, Vice-President, Roekel Co., Zanesville, O.

75.—Joseph Hirshstein, President, Josam Mfg. Co., St. Louis, Mo.
76.—Harry C. Potts, of Roberts-Potts Co., Columbus, O.
77.—J. Harry Bacon, Jr., Detroit Representative, Mouat-Squires Co., Cleveland, O.
78.—Henry H. Bell, Proprietor of Estate of Andrew Bell, Newark, N. J.
79.—George M. Snyder, Sales Manager, The National Sanitary Co., Salem, O.
80.—Paul Munk, Representative, Blue Seal Chemical Co., New York City.
81.—Thomas Mangan, Representative, Elgin Brass Co., New York City.
82.—E. W. Berg, Advertising Manager, The Mechanical Rubber Co., Chicago.
83.—Bert H. Hallett, Manager, Range Boiler Department, W. A. Case & Son Mfg. Co., Buffalo, N. Y.
84.—James Weir, Secretary and Manager, Weir & Craig Mfg. Co., Chicago.
85.—H. E. Pursell, Sales Manager, The Kewanee Boiler Co., Kewanee, Ill.
86.—William G. Le Compte, Representative, Jenkins Bros., New York City.
87.—F. F. Bulkeley, Representative, The Cleveland Faucet Co., Cleveland, O.
88.—C. C. Wedding, President and Manager, American Valve & Tank Co., Fairmont, W. Va.
89.—Wm. J. Bapst, Greater New York Representative, The Trenton Potteries Co., Trenton, N. J.
90.—W. F. Jones, Representative, National Tube Co., Pittsburgh, Pa.
91.—Jack Cripps, Representative, The Eagle-Picher Lead Co., Cincinnati, O.
92.—Joseph Nelson, President and General Manager, Joseph Nelson Supply Co., Salt Lake City, Utah.
93.—N. O. Nelson, President, N. O. Nelson Mfg. Co., St. Louis, Mo.
94.—O. P. Benjamin, Vice President and General Manager, Detroit Valve & Fittings and Detroit Brass Works, Detroit, Mich.
95.—D. E. McCabe, Manager, Chicago Branch, International Heater Co., Utica, N. Y.
96.—James H. Caffray, Representative, Coyne & Delany Co., Brooklyn, N. Y.
97.—Monte F. Jacobs, Manufacturers' Representative, New York City.
98.—Frank R. Noss, Assistant Sales Manager, The Royal Brass Mfg. Co., Cleveland, O.
99.—C. C. Todd, Vice President, The Central Foundry Co., New York City.
100.—E. C. McNair, Sales Manager, United States Radiator Corporation, Detroit, Mich.
101.—A. H. Probst, Representative, Consolidated Engineering Co., Chicago.
102.—J. J. Blackmore, Manager, Heating Department, J. L. Mott Iron Works, New York City.
103.—F. R. Bishop, Manager Plumbing and Heating Department, The Hawkeye Supply Co., Mason City, Ia.
104.—C. F. Martin, Representative, H. P. Martin & Sons, Owensboro, Ky.
105.—Wm. I. Creese, Manager Cleveland Office of the J. L. Mott Iron Works, New York City.
106.—L. B. Jenks, Central States Manager, Youngstown Sheet & Tube Co., Youngstown, O.
107.—L. M. Berwin, Vice President, Monash-Younker Co., Chicago.
108.—Prof. W. J. Baldwin, Heating and Ventilating Engineer, New York City.
109.—Frank E. Baker, Manager Bulletin Department, James B. Clow & Sons, Chicago.
110.—E. V. Prigham, Vice-President and Sales Manager, Kalamazoo Sanitary Mfg. Co., Kalamazoo, Mich.
111.—J. R. Dulany, Vice-President and Sales Manager, The Chamberlain Co., Pittsburgh, Pa.
112.—Leon Goodspeed, Representative, Wolverine Brass Works, Grand Rapids, Mich.
113.—F. B. Hackett, Representative, National Plumbing & Heating Supply Co., Chicago.
114.—Harold Maddock, Sales Manager, Thomas Maddock's Sons Co., Trenton, N. J.
115.—Walter Jamieson, Sales Manager, The Ohio Brass Co., Mansfield, O.
116.—Frank M. Minninger, Representative, A. M. Byers Co., Pittsburgh, Pa.

PROF. JOHN R. ALLEN ADDRESSES ILLINOIS HEATING AND VENTILATING ENGINEERS AT DECEMBER MEETING.

"What We Do and Don't Know About Heating" was the subject of a very interesting address delivered by Prof. John R. Allen, dean of the College of Engineering and Architecture, University of Minnesota, at the December dinner and meeting of the Illinois Chapter of the American Society of Heating and Ventilating Engineers, held Monday evening, December 10th, at the Engineers' Club, 314 Federal street, Chicago. A large attendance of the membership welcomed the professor and listened with interest to his address. He brought to the Chapter the cordial greetings of the newly formed Minnesota Chapter, of which he is the leading spirit. Following his address he was vigorously applauded and then came the questions—which were fired at him from all corners of the room. His line of reasoning, fortified by years of arduous study and research, held firm. The first-line trenches of his position on heating problems could not be broken.

"There are many things we know about heating," said Prof. Allen in his opening remarks, "but there are also many things that we will never know, because the problems involve too many changeable variables, which can never be solved.

"Let us start first to elaborate this subject by considering the laws of heat. Most of the useful experiments that can be immediately applied to heating were first made by Peclet in 1840 to 1850. Peclet's work was translated into English by Box about 1880 and is given in Box's 'Treatise on Heat.' Almost every author since Box's time has quoted Box and given Box's constants for radiation, conduction and convection. Some authors have given him credit, but most authors seem to have forgotten the source of their information.

"In recent years, little fundamental work has been done by physicists upon the subject of heat and its application. The modern physicist is wedded to electricity and he can tell you the electrical resistance of iridium and titanium and all the metals that are never used for electrical conduction, but he cannot tell you the heat resistance of a brick or a piece of stone or a piece of concrete. There is a real reason for this. Heat is difficult to experiment with accurately, and electricity is the easiest of all the fields of research.

"Some years ago I started to check up the German constant for glass, which is the most fundamental constant that we have. I found that for dry glass with no rain or wind the constant $K = .64$; for rain and no wind $K = 1.248$; for wind and no rain $K = 1.05$; for rain and wind $K = 1.485$. The generally accepted constant by authors as determined by the German Government is 1.33, and for fifteen years we have accepted this constant. It is entirely possible to have the glass surface wet even in zero weather and the constant is manifestly too small. Personally I am now using $K = 1.25$ as the glass constant.

"We need in this country a vast amount of experimental research so as to place these fundamental constants of the heating business on a well established foundation.

"As we get more and more exact knowledge, this information should be used by the engineers so as to leave less to experience and more to actual figures. It will never be possible, however, in heating work to entirely eliminate the factor of judgment. We have so many variables entering into the problem, such as the conditions of building construction, and the materials used, that we will always have to make our figures only the basis for our judgment."

REVIEW *of* BUSINESS CONDITIONS *in the* BUILDING TRADES, WITH OUTLOOK *for* IMPROVEMENT *in* 1918

Situation in Construction Activity During the Past Year and Future Prospects for the Plumbing and Heating Industry

REPRESENTATIVE men of the plumbing and heating crafts have had varying business experiences during the year. The erection of dwelling houses has fallen off generally throughout the country, while at the same time the building of factories and workshops has increased in some cities to such an extent as to make local building operations normal.

Men in the trade have been heard to express different shades of opinion, in which both pessimism and optimism were reflected. Many have no doubt experienced a difficult year, owing to the fact that business generally has been laboring under unusual conditions brought on, of course, by our entrance into the war. The fluctuation in prices of materials during the past six months, has also tended to aggravate still further the status of industrial activity in the building trades.

Lack of adequate transportation facilities for the conveyance of different kinds of materials for construction purposes is another factor, which has halted a greater activity in the building industry. This condition, it is hoped, will clear up, in view of the fact that the government is carrying out regulation measures.

The organized building industry, representing a considerable number of contractors, has also taken steps in the hope of improving the transportation facilities. Action has been taken by organizations of contractors in the principal cities, relative to conserving or protecting building interests during the war, and campaigns of education and publicity have been launched, with the purpose in view of enlightening the mind of the investing public and encouraging continued activity in necessary building operations. Contractors are also urged to cultivate the field of remodeling and repairing in their respective communities. It has been shown that activity along these lines will help to make up in part the industrial deficit brought on by the present slackness in new home building operations.

In Canada, for instance, plumbing and heating contractors, who had been busy before the entry of that nation into the war, found themselves confronted by a depression in their lines some months after the country's participation in the world conflict. New dwelling work had decreased alarmingly. Men in the trade then realized that they could employ their energies in another field, overhauling and remodeling. Many houses and flats in the principal cities had been entirely or partially vacated, due to the exodus of those, who had entered the army. Contractors then exerted their efforts in convincing property owners that in order to rent the vacated houses or flats, they must keep them up-to-date and sanitary. They pointed out that persons, coming to the cities to work in the large plants manufacturing war supplies of all kinds, and who received good wages, were desirous of occupying comfortable quarters, and that they could be secured as tenants, if the improvements suggested were made. As a result plumbing and heating contractors in Canada have in many instances been active in installing new systems of plumbing and heating or remodeling old ones.

Manufacturers and jobbers of plumbing and heating goods are on the whole inclined to the firm belief that the building industry as well as American business generally is passing through a period of readjustment, incident to the war, and that during the next year the situation will have shaped itself into a more satisfactory condition.

Supply men in the plumbing and heating lines are regretting the prevalence of high prices for materials and the consequent depletion in the stock among plumbing and heating contractors in many localities. They also attribute the lessened activity in building operations partly to the existence of the present high cost of materials.

The general feeling, however, among the manufacturers and jobbers, relative to building conditions, is that the period of dullness, as compared with the brisker activities of last year, will gradually change for the better, and that the months of 1918 will show considerable improvement in constructive activity of all kinds.

Many men in the trade state that the year 1917 has been profitable, and that they have no cause for personal complaint, having disposed of a great volume of business during the year, a volume which exceeds or compares favorably with that of other years.

Considering the unsettled state of affairs in the political conditions prevailing throughout the world, it is difficult for anyone to make any definite or trustworthy predictions for the future, but the supply men, like other men in industry, are generally of optimistic mind, feeling that while we must co-operate to the uttermost to speed up the winning of the war, we must also remain cool and self-composed, resting assured that the dawn of a brighter day awaits the business men of America.

Price Regulation—Steel, Iron and Copper.

When the government took steps to regulate the prices on steel, iron and copper, there was a general anticipation that prices on plumbing and heating materials would soon begin to decline and that this reduction in prices would be instrumental in quickening the pulse of building activity. Some in the trade contend that this decline in prices will still be brought about, while there are others who maintain that they see no immediate change in the price situation, owing to the fact that it is

impossible to secure raw material at the government price, and also because of the advance in the cost of labor, coal and other necessary materials used in manufacturing. The Standard Sanitary Manufacturing Co., of Pittsburgh, Pa., refers to the fact that iron is the only commodity entering into the manufacture of enameled ware that has been reduced in price, but calls attention to the high price of every other item, labor included. The company states: "The price of chemicals is still advancing with no prospects for lower prices, while the war lasts. Fuel of all kinds is higher than it ever was in the history of the industry. There is still a further condition which confronts the manufacturers of enameled ware, as well as all other manufacturers, and that is the difficulty of obtaining raw materials from which to produce the finished goods we sell, so after a careful survey of the entire situation, we are constrained to say that we see no immediate warrant for lower prices on enameled ware." It appears that copper demands have been and are tremendous for war purposes, nevertheless the production of the metal has increased enormously during the last three or four years. A safe estimate of the 1917 smelter output is fully 2,000,000,000 pounds. Total consumption of the metal in the United States in 1916 was estimated at 1,600,000,000 pounds, and although the entrance of this country into the war has greatly increased the consumption of copper, it is probable that the total production will be adequate to care for the total demands.

Labor Conditions.

Labor conditions have been unsettled in a number of industries during the last six months, particularly in the war industries. Some troubles have been reported in the building trades, but they have not experienced the same extent of labor unrest that afflicted industry in general. Strikes in the building trades have not been of alarming proportion as compared with other lines of work.

Contractors engaged in large building enterprises have complained against the floating tendency of labor. Men have been hired, who were considered good men, and perhaps gave satisfaction for a couple of weeks and then threw up their jobs and moved on. With help scarce and good wages paid almost everywhere, the workman gets a feeling of independence, which soon becomes one of celebration. He decides to see the country a little, working enough at one job to carry him on to the next one. Ultimately he gains nothing by such wanderings, because it is always the job farthest away that looks most attractive. Probably the only cure for this tendency is the return of normal conditions of supply and demand for labor.

Demand for Increased Building Activities.

Leaders in the building industry have pointed out that many forms of building and construction work are essential, if American business is to be kept at its maximum during the present world crisis. The most encouraging features of the present outlook for building and construction of a necessary character is the rapid growth of the movement for mobilization of building interests on a nation-wide basis. Already committees are at work determining the demand for building, supply and price of materials, availability of money and the supply of labor. It is recognized that without knowledge of these basic facts little could be accomplished, and progress is rapidly being made to ascertain these facts.

It has been declared that there is much to be learned from England's experience during her three years of war, and we are advised to use this experience as a guide in determining the policies by which American industries can be most rapidly and profitably adjusted to war conditions. It is explained that there is one lesson, which we may learn from England, a lesson which arises from her mistake of failing to mobilize her building interests, to study her building problems, and to advise and direct her building forces so as best to promote her national welfare. It is but natural that unnecessary building should be curtailed in this country, as has been done in England. Unfortunately, however, with no central construction advisory board to investigate and determine what was and what was not needed in the way of building, England made the mistake of classing the home building industry as non-essential. The fact that the English government was at length obliged to provide aid for building a huge number of houses of the cheaper sort, shows the folly of such a classification at the beginning of the war. In England, while factory building has increased, dwelling construction has decreased. As a result, workingmen are being crowded into closer and closer quarters in the busy English manufacturing cities. The more factories at a given place, the more men are required to work and live in that place. But unfortunatley, while factory accommodations are increasing, housing accommodations have not. This, in brief, is the situation that confronts England today.

"It is to avoid such unbalanced conditions of building and construction work in this country," says the "American Contractor," that the movement for the temporary mobilization of the construction interests is now under way.

"Only after careful planning and investigation can anything be accomplished toward directing the energies of an industry along lines that will prove most helpful to the nation. It is for the purpose of organizing the construction forces of the United States in order most wisely and effectively to serve the nation and the public welfare that the present national movement has been started."

$150,000,000 For Cantonments.

During the last half of the present year, the federal government has expended approximately $150,000,000 in the building of cantonments for the training of the new national army. The building operations represent nearly sixteen constructed cities. The largest amount appropriated in any one previous year for government work was for the Panama Canal, the great sum of $46,000,000. Practically every detail, entering into the building of a civilian city, has confronted the army in the construction of its cantonments. Within sixty days 190 mills, in all parts of the country, shipped to the cantonment sites more than 500,000,000 feet of lumber. Approximately 24,000 freight cars were used for transportation of this lumber.

From 5,000 to 10,000 men have worked upon each of the emergency cities. Each cantonment contractor has handled about 5,000 carloads of material. Weekly pay rolls have run as high as $150,000. A carload of roofing tacks alone was required to nail down the 6,000,000 square feet of paper roofing for the protection of the cantonment building. Altogether 93,000 kegs of nails have been driven and there have been installed 140,000 doors, 686,000 sashes, more than 3,000,000 square feet of screens, 139,000 rolls of sheathing paper and 29,250,000 square feet of wall boarding. To light the army cities, 250 street lamps and 20,000 inside lamps have been used at each site. All of this material was transported during a period of traffic congestion on the railroads.

Plumbing and Heating of Cantonments.

The plumbing and heating contractors in various sections of the country, North, South, East and West, have been very busy in the installation of plumbing, sewerage and heating systems in the cantonments. The sanitary welfare and physical comfort of the soldiers during the winter months have been made subjects of special study by the engineering department of the movement. A typical instance of the extent of plumbing and heating materials, used in cantonments, is that of one situated in the East, erected at a cost of $8,000,000. The fixtures used were as follows: 2,700 water closets, 700 urinals, 600 lavatories, 100 heaters, 100 boilers, 300 tanks with coils, 250 tanks for kitchen, 22,000 showers, 500 sinks, 350 grease traps, 150,000 feet of piping valves and fittings, etc.; heating apparatus, 500,000 square feet of radiation, and 7,368 radiators.

Building Operation—1917 and 1916.

Following are the comparative figures showing the aggregate amount of building permits in all of the principal cities of the United States for 1917 and 1916:

1917.		1916.	
January	$55,910,349	January	$50,490,041
February	51,232,682	February	54,021,755
March	79,284,262	March	83,624,502
April	86,100,925	April	94,029,102
May	75,168,153	May	114,331,891
June	61,287,611	June	95,964,649
July	58,726,904	July	115,313,797
August	49,118,123	August	73,614,908
September	51,754,484	September	70,380,161
October	56,251,179	October	87,692,090
November	43,504,682	November	72,097,683

AS SEEN *by the* TRADE

John B. Berryman, First Vice-President of Crane Co., Chicago.

To the best of my knowledge, all manufacturers in our line have been fully employed during the current year. The limiting factor has been the labor supply. We anticipate a large demand for the industrials during 1918, but the decrease in building will curtail the demand for certain classes of product.

E. V. Brigham, Vice-President of the Kalamazoo Sanitary Manufacturing Co., Kalamazoo, Mich.

Regarding the outlook for the year 1918, we believe that there will be some change in 1918. Building has practically been at a standstill for the past four or five months, and very little new material is being used. Therefore, we do not anticipate any great amount of business during the first three months of 1918.

Geo. H. Laib, President of Laib Co., Inc., Louisville, Ky.

The Phrase: "As usual," belongs to the *Past*, "Preparedness" applies to the *Present*, and "The Unusual" to the *Future*. Hence business must be guided accordingly, and if I were to express myself more fully on prospects it would be based on the above. However, there is no virtue in gloom, and we may depend upon the democratization of the world being the final victory, which means more to the business of this country than the immediate prospects.

John A. Murray, President of John A. Murray & Co., New York City.

Business conditions during the year of 1917, taking into consideration the unsettled state of affairs of the world, have been satisfactory. I look upon the year 1918 with optimistic vision. The line of goods we merchandise are necessities for the welfare of the people. Hence, there will be a demand for our goods, more or less, as the people of our country gradually learn the lesson of economy. Much of the work that might be accomplished will be delayed till the dawn of the brighter day, and only the emergency demands will be taken. It behooves us, who are left at home, to take care of the business interests of the country, to buckle on our armour and go forth to do our part in maintaining business at home, providing for the needs of our government, the soldiers at the front, and the people at home. We can exercise our patriotic spirit at home in doing our part to save our country from business disaster.

L. C. Huesmann, President and Manager of the Central Supply Co., Indianapolis, Ind.

L. C. Huesmann.

As far as the New Year is concerned I have no opinion of my own to offer. The role of prophet is extremely difficult to fill when times are out of joint, like they are at the present. The feeling that I have, and this feeling has been growing steadily, is that the overshadowing question is to win the war. Judging from the state of affairs in Russia and the recent reverses in Italy, it would seem as though the United States would have to take off its coat and get to work in earnest, and that the people of this country will have to make real sacrifices, sacrifices that hurt, before the victory is ours, and the peace of the world re-established.

H. C. Cornelius, Secretary and Treasurer of Wolverine Brass Works, Grand Rapids, Mich.

Our business in 1917 is about 10 per cent in excess of 1916 business. During the last two months, however, business in the plumbing line has been very quiet and has been principally for repair material. The great slump in building operations naturally has reduced the sales of new goods for installation. I believe that in 1918 business will be booming in the country, but not in all lines, and firms who want to keep up their volume will, of necessity, be obliged to take on more or less Government business, either directly or indirectly, for the business of the country at the present time is to win this war, and we have all got to put our shoulder to the wheel and help do it, and all business from the Government down will be in this direction. With the immense amount of money that is to be spent, and is being spent not only on war material, but on railroad equipment and other contingent industries, there will certainly be plenty of business to be done, but industrial institutions will have to regulate their business along lines where the business is to be secured and not depend entirely on their old sources of supply to keep them going.

M. J. O'Fallon, President of the M. J. O'Fallon Supply Co., Denver, Col.

There is no question, and all are agreed, as to the effect of the high prices on plumbing and heating material, as well as other goods in the building line, namely, the erection and construction of buildings will be much less, throughout the country. This condition will hardly change very soon, although I believe that the last six months of 1918 will show more building activity throughout the country than the last six months of the present year. While out here, in the West, we are affected on account of the conditions referred to, I believe we have not suffered quite as much as they have suffered in the East.

W. C. Longenecker, Treasurer of the Toledo Pipe Threading Machine Co., Toledo, O.

W. C. Longenecker.

The volume of our business during 1917 has been considerably greater than any previous year. We will carry over into 1918, orders that will keep us busy until March. What the year 1918 will bring forth we do not know. It looks now, however, as though next year's business would continue to be derived from abnormal sources. We are longing for the time to come when peace may again prevail, and the country may proceed to readjust itself again to normal conditions. It need hardly be said that all our efforts in the meantime will require to be directed toward the most vigorous and persistent prosecution of the war and the war propaganda, whether by so doing it hinders or helps our individual businesses, for in this direction lies the surest way to peace.

P. J. Frey, President and Treasurer of the Central Supply Co., Minneapolis, Minn.

Business operations continue steadily, and even though in slightly smaller volume, the elimination of extreme fluctuations places all commercial transactions on sounder footing, and clarifies the atmosphere. Taking business as a whole for 1917, up to December 1st, judging by our own experience and observation, it has been a very fair year. As to the future, or 1918, we feel rather reluctant about expressing our opinion as to the outlook of business in this part of the country, although we generally take the optimistic side of things. We believe, however, present indications point to a fairly good volume, at least so far as the first and second quarter of the new year are concerned.

Chas. D. Symms, President of the Plumbing Supply Co., Sioux Falls, S. D.

As there have been so many ideas set in type concerning the present, past and future business conditions, it is rather difficult to offer anything of further interest except that locally we have during this year enjoyed a trade which has been most pleasant and profitable. We are approaching the winter months with a substantial business booked, in fact, much larger than heretofore, leaving us confident that January, February, and possibly March, sales will be of such proportions as to insure us a profitable winter. There is considerable in sight for 1918 in the way of public and semi-public buildings, though the residence work no doubt will be considerably curtailed owing to the high prices and uncertain conditions. But taking it all in all we are well satisfied and quite optimistic for the first half of 1918 at least.

J. L. Sullwold, President and Secretary of the Western Supply Co., St. Paul, Minn.

Regarding business conditions in our section I have to say that our business has fallen off very materially, and from the present outlook we do not anticipate that we will be able to market more than 40 per cent of our normal tonnage during 1918, and this is an outside figure, regardless of the fact that we are in an agricultural district, and that the farmer is getting big prices for everything that he produces. Conservation has been so thoroughly advertised in the press, advising not to spend an unnecessary dollar, that the effects are felt even in the retail business. The writer is absolutely satisfied beyond a doubt that business will not resume until raw material and manufactured products are materially reduced in price, and, in my judgment, the sooner this fact is realized, the sooner business will resume, and then it will not be normal during 1918. We are located in a wealthy agricultural district and the farmer is getting good prices, but we know from actual experience during the last four months that he will not buy plumbing and heating material at present prices. We dislike very much to write a pessimistic letter, but we are giving you our views as we see them.

Wm. Q. Wales, President and Treasurer of Brown-Wales Co., Boston, Mass.

Business has been very good with us during this year, but has fallen off somewhat in the building line, which affects more or less our department in plumbing and steam supplies. We have been quite busy, however, in the sheet metal branch, also in the iron and steel department. We do not look for much increase in the building line until the war is over, as every one hesitates about erecting residences or other buildings considering the present high cost of labor and material. It has never been so difficult to form an opinion as to the future as at present, as apparently everything depends on the termination of the terrific struggle which is going on across the water. Everyone's energies and thoughts are turned in that direction, and it is difficult to forecast domestic affairs. Just at present conditions seem to be very favorable on the other side of the sea, but as reverses come unexpectedly, it is not safe to pass any prediction for the future. Credits for the last year or two have been exceptionally good, but it seems now to be a time when greater caution should be exercised in this line. Prices are abnormally high in all lines of goods, and it is extremely difficult to know how to care for one's stock. Caution seems to be the best attitude to take for the present. We have been blessed with two or three years of good business, and must now expect to pay the penalty in the shape of declines and heavy taxation. Conditions in the latter will probably never be as they have been, as the tendency of our government seem to be to increase expenses, and the enormous interest charges incurred for the future will, of course, draw heavily on the income of the country.

We can only live with safety from day to day, and be careful how we buy and how we sell.

At this Thanksgiving season of the year, we have much to be grateful for: That the war is not on our side of the water, and for the prosperity this country has enjoyed,

as well as the backing that the government is receiving considering our mixed population.

We must keep up our optimism and faith in the future of the country. I do not believe that matters are going to be worse than they are at present, and I hope for an improvement.

E. A. Morris, Secretary and Treasurer of the Detroit Lead Pipe Works, Detroit, Mich.

Regarding the condition of business at the present time and the outlook for next year, I can only say that, outside of war business, trade in our line is very dull and I am afraid it will continue in the same condition for some time to come, unless there should be a cessation of hostilities on the other side. Manufacturers in some lines have been piling up goods for the past few months and now realize, in order to move them, they are obliged to reduce prices. This, together with the large stock of low-priced goods in the hands of jobbers, is bound to create a demoralized condition, as far as prices are concerned, and I would not be surprised to see the market react almost to the basis before the war.

C. V. Kellogg, President of the Kellogg-Mackay Co., Chicago.

C. V. Kellogg.

No one living can anticipate the future under the present abnormal conditions. Many people are thinking that some morning they will wake up to learn that the war is ended. In my judgment they will have to wait for at least five years. This country will probably require five million men engaged either upon the battlefield or doing something necessary to sustain soldiers in the trenches. Probably it will require one hundred billion dollars to finance this country and such sums as this country may have to loan to the Allies. Hence, under these conditions no one can foresee the effect it will have upon the line of industry which we represent.

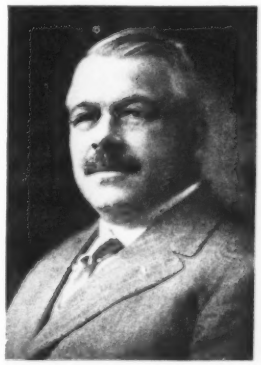
The Government will probably require eighty per cent at least of all the steel production That is all steel billets to the extent of at least eighty per cent will be required to be fabricated into material required by the Government, leaving only twenty per cent for domestic use.

While the Government has fixed prices on certain raw material and commodities at a price lower than the published prices heretofore, yet it has made no apparent difference in the cost of articles produced therefrom, and it is impossible to obtain material in many lines. It is my judgment that building operations will be very much less in the aggregate during 1918. That the requirements for material will be much less for domestic use, and while the requirements will be less, yet I think the demand will exceed the supply, and any one having material on hand would do well to conserve it to fill orders which they will receive and be unable to obtain material to replace.

While there may be some readjustment in prices on some specific articles, yet the cost of labor, the decreased volume of production, and the cost of many items of raw material, that are necessary in the production, notwithstanding the price of pig iron or steel billets have been reduced, will create an increased cost in finished articles, and it is my recommendation to "Domestic Engineering's" readers, that it is no time to speculate. That it is best to buy for immediate requirements. Place orders immediately upon execution of contracts for the installation of plumbing and heating and have material delivered as promptly as possible and not place "advised orders," because they may not be able to obtain the material when they wish to use it.

It is a year when it is important to economize in overhead and all items of expense possible, and to figure an increased per cent of cost for overhead and incidental expenses, such as they have never had before. It will be a year in which every one should do business at the present time and not in the future.

Guilford R. Adams, Rochester, N. Y., President of the Eastern Supply Association.



Guilford R. Adams.

Instead of reviewing business conditions as they refer to the city of Rochester, N. Y., I will make some reference to the Eastern Supply Association and the work it has attempted to do during the year. The secretary's report of October, 1916, gives the total at that time 192—a net increase of five during the year, and quoting from this report: "We are near the 200 mark. Let us strive to make it during 1916-1917." How well this was accomplished, the reports of October, 1917, show: 13 new members in February; 16 new members in June, and 10 new members in October, bringing the total to 227, besides eight branch members—a new departure in our association.

We have been extremely fortunate in securing speakers for this year. In February we had the following addresses:

"Efficiency Club Work in Our Organization," by Otto G. Hitchcock, of Hays Mfg. Co., Erie, Pa.

"Our Responsibility," by Wm. Smedley, of Philadelphia.

"Are We Merchants or Order Takers?" by Vice-President Joseph F. Evans, Wilkes-Barre, Pa.

"Standardization," by Harry E. Speakman, Wilmington, Del., besides many reports from various committees and individuals.

At the June meeting, addresses were given as follows:

"Building Young Men for Business," by George H. Van Arnam, of Fort Wayne, Ind.

"The United States Before the World," by Hon. Job E. Hedges, of New York.

"Reasons for Advancing Cost of Earthenware," by Philip J. Faherty, of Lambertville Pottery Co., Lambertville, N. J.

"Conservation of Stocks," by W. A. Brecht, of Krupp Foundry Co., Lansdale, Pa., besides many other reports and papers.

The October 10th meeting was of an intensely patriotic nature. The singing was led by Stanley Hawkins, camp song leader of the Y. M. C. A., Camp Dix, N. J.

Addresses were as follows:

"The Liberty Loan," by James H. Baker, of New York.

"War Service Committees," by Waddill Catchings, of Washington, D. C.

"Autocracy and Democracy," by Dr. Talcott Williams, Columbia University.

Original poem, "Let Him Live," by F. D. Van Amburgh, editor of "The Silent Partner."

"Public Comfort Stations," by Frank K. Chew, editor of the "Metal Worker." Many matters of importance to the trade were discussed.

From October, 1916, to October, 1917, a total of $108,-295.03 was collected through Secretary Hanley's office, a record-breaking showing.

On February 20th both the writer and Secretary Hanley attended the fifteenth annual dinner of the New England Sanitary Club, at Young's Hotel, Boston, a delightful occasion.

On May 9th the board of directors adopted a resolution, pledging the support of the association to the president of the United States, and received his acknowledgment of same.

On May 15th, Secretary Hanley wrote Hon. Wm. A. McAdoo, Secretary of the Treasury, offering assistance on the First Liberty Loan, and a bulletin was sent to our members urging their purchase of the Second Liberty Loan.

In all, over fifty printed bulletins have been sent to our members, calling attention to market conditions, lists of overstocks, committee reports, etc.

While the outlook for business is not at all bright, the spirit of helpfulness and co-operation between the manufacturing and jobbing members of our organization is so marked that we are looking forward with hope. This is summed up in the following sentence from my annual report: "Helpfulness seems to have been the key word of the members and one of the meanings of the letters E. S. A. has been proven to be: Each Serving All."

E. L. Strauss, President of the Central Brass Mfg. Co., of Cleveland, O.

E. L. Strauss.

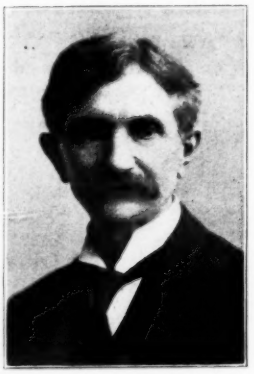
The year of 1917 will long be remembered as one of the most peculiar years in the business history of this country. At the beginning of the year we found ourselves on the crest of the wave of unexcelled prosperity. In April came our declaration of war and soon thereafter a decided slackening in the pace was noticeable in all lines, which did not contribute directly to the conduct of the war. It was not reasonable to suppose that we could give millions of our best producers to our army and also make the necessary preparations for entering this gigantic struggle without diverting from our channels the wealth and productive power of this country. We are undoubtedly producing more material today than the country has ever produced, but the nature of this production has changed.

It is only reasonable to suppose that as the war progresses and as we are forced to meet greater demands for men and material, ordinary business will suffer, but we will undoubtedly find, as England has found during the past three years, that by utilizing some of the latent energy of some of the nonproductive masses and by the application of greater efficiency, we will be able to meet all demands that are placed upon us by the war and still continue many of our usual peaceful pursuits.

In our own particular line there should be but a slight decrease in the volume of business. We cannot expect to continue the pace of 1916 and the early part of 1917, but we undoubtedly shall equal our records of 1913, '14 and '15. The reason for this is very clear. People are earning more than they have ever earned before and therefore demanding better homes. This is shown by the fact that in every large center the demand for homes of all classes has been in excess of the supply. This demand must be met. The increased demand put upon the manufacturers of this country calls for new factory buildings and other commercial structures. This demand also must be met. To meet these demands and also the demands of our Government will require very careful planning on the part of our ablest leaders.

America has always risen to the occasion and has been at her best in the face of the greatest difficulties, therefore I look forward to 1918 as a year of the greatest achievements this country has ever seen.

N. O. Nelson, President of the N. O. Nelson Mfg. Co., St. Louis, Mo.



N. O. Nelson.

This being my 74th Christmas I might be expected to send you a memento equal to 74 years of activity, a box filled with wisdom of the ancients, but allow me to make use of your widely circulated pulpit for a sermon to your more or less pious readers. Piety has always been an adjunct to the plumbing profession, understand I say profession, not trade.

The morning paper headlines, the half dozen noon and afternoon editions, and the weeklies and monthlies pester us with news, good, bad and guessing. Suppose for Christmas we count the war as we do earthquakes and storms and other awkward elements, as outside of our Christmas game. Suppose we consider what Christmas stands for.

There was a man born 1917 years ago who went about what we now know as Palestine, mingled with the common people; occasionally read the riot act to the men in authority, priestly and political. All the time He circulated among the common folks, not exactly an I. W. W. or hobo or Bolsheviki, but decidedly friendly with that class. He did not have a bishop's palace nor a prominent preacher's salary. His biographers say He didn't have a regular place to sleep. He practiced what He preached, that all men were brothers, that riches were worse than a delusion and a snare, that they were deadly and criminal.

He said a prayer: "Give us this day our daily bread, and forgive us as we forgive others." He said: "Peace to men of good will." He said: "You could not serve God and Mammon."

For a hundred years after He was crucified by the orthodox priestly authorities, His followers lived by His principles, lived as brothers, put their work into community use. In about three hundred years these principles had made such headway in making converts that the Roman Emporor Constantine thought it good politics to absorb the Christian Church as a political adjunct, at the same time imposing on it most of the pagan principles and organization. Since that time the church has been a political and ecclesiastical power.

It is well for all good people, whether Jew or Gentile, Christian or heathen, orthodox or heretic to read the

Gospels that tell about the teachings and the life of Jesus, when He lived, and take serious lesson from it. Very many of my readers will recognize how much we need these teachings. We have everything to gain and nothing to lose by imbibing them and trying to act on them.

Let me do the important thing of justifying my preaching by telling, that at Leclaire, Ill., I have since 1890 made a community of home-owning and profit-sharing employes, enjoying all the social facilities. At Bessemer, Ala., in connection with our pipe works, we have a kindergarten of about 150 picanninies, a hall, a play ground and other social adjuncts.

In connection with my 60 co-operative grocery stores in New Orleans, I have a 1,600-acre plantation on which we have a school, kindergarten, band, baseball clubs, and all desirable community conveniences.

Let us win the war for democracy, political, industrial and social!

Geo. E. Trudel, President of the Geo. E. Trudel Co., Manchester, N. H.

In reviewing business conditions for the year 1917, we find that our business to November 1st has increased 15 per cent over the same period of the year 1916. While sales in our city have decreased, the returns from the surrounding territory have increased. The plumbers' stocks in our territory have been very much depleted for the last two years, owing to high prices, and most of them have bought for immediate needs only, and will continue to do so until market conditions are settled. We find that a lot of anticipated contracts for new buildings have been abandoned but that more alterations and improvements are taking place. From the present outlook in our local territory we expect very good business for the year 1918.

Our San Francisco Correspondent.

All business on the Coast, as elsewhere, shows the effect of the world-wide war. These effects have been accentuated by the entrance of the United States into the conflict, and the consequence Government regulations of prices, transportation supplies and sources of supply. These abnormal conditions have affected the erection of new buildings, and through this the sale and installation of plumbing and heating supplies, perhaps more than any other line. Notwithstanding this fact, building operations in this State, and especially in the valley regions and about the Bay, have about equalled those of previous years. But here again the abnormal conditions enter the problem and vitiate the comparative usage of plumbing and heating equipment, which in normal times can be adduced from building operations. This is so because of the nature of the building which have been going on. The statistics show that there has been a marked falling off in the number of private homes built, and an increase, in valuation at least, in the amount of large office buildings, schools, and public buildings for State and Federal use. Consequent upon this there has been a falling off in the amount of work for the plumbing and heating contractor.

John L. E. Firmin, secretary of the Master Plumbers' Association, however, says that this diminution of business is not to be classed as serious. It is "merely a temporary dull spell." He expressed the opinion that the conditions arising from the war were slow in showing in this city and that they were not nearly as severe as in other parts of the country. The Bay region, he says, was on the crest of a big wave of prosperity when the war broke out, and that the wave will rise still higher, as soon as the war comes to an end, is his belief.

The increased cost of all supplies has not affected the business as much as the uncertainty, especially the uncertainty in regard to prices. The Government action in regulating the prices of materials which go into plumbing supplies, boilers, radiators and other supplies of this nature, has caused a hesitation on the part of builders, especially the announcement in September that these prices were subject to readjustment on the first of the new year. This is generally understood to mean a further reduction, and builders are holding off, wherever they can, to see what the new year will bring forth. Whatever may come from this Government action the general opinion in the trade is that by spring there will be a great increase in building operations, especially in homes. The State as a whole particularly in the valley regions and about the Bay, is in a very prosperous condition. The farmers have made a great deal of money and the population of the interior cities is showing a decided increase. About the Bay the manufacturing industries are increasing their plants and new enterprises are being started. Both these facts mean the need of more homes for the workers and more business in plumbing and heating supplies. In San Francisco there are many apartment houses, which were spared by the great fire of a dozen years ago, which are practically tenantless today because of the lack of modern plumbing or heating appliances. If new building operations prove too expensive or too difficult, through the lack of material, during the next year many of these old places will be modernized and equipped with sanitary plumbing. There are enough of these to make an important addition to the local demand for plumbing supplies, and they must be modernized in this way or new buildings built for the accommodation of the increasing population.

While the wholesalers are not complaining of the year's business and report that their collections have been good, they have decided to modernize their business in the matter of collections, and have just issued a circular to the effect that after March 1 the usual 2 per cent discount for cash will be extended to those only who pay their previous month's account by the 10th of the month. Payments after the 10th and before the 15th will not be accorded any discount, and after the 15th all credit will be withdrawn. The master plumbers consider this a wise move, as it will soon eliminate the irresponsible contractors and thus help to stabilize the business.

Another feature which has developed during the past year, and one which is going to have an important bearing on the trade in the future is the increase in the number of manufacturers' representatives, which are carrying stock, and thus giving the jobber, plumber and consumer the advantage of carload rates on all shipments. This difference amounts to $2 or more a hundred pounds between carload lots and broken lots. The carrying of stocks by the manufacturers has been of advantage to the jobbers also from the fact that the latter are not compelled now to carry such large stocks in their own warehouses. The Standard Sanitary Mfg. Co. was the first company to add a stock to its general office here. This was followed by the Trenton Potteries Co., of Trenton, N. J. As yet the latter company has not succeeded in installing a large stock on account of the fact that the Government is taking such a large percentage of its output. However, the company has some stock on hand, and has established a good display. Added to these the Thos. Maddock's Sons Co., of Trenton, has established an office, with Frank Kelley in charge, and as soon as possible will doubtless carry a stock. In the meantime all their shipments come through in carload

(Continued on page 472.)

Cold Water and Desolvo

When DESOLVO is mixed with water, a violent reaction takes place immediately, generating intense heat and powerful gases. This solution goes direct to the obstruction and dissolves all soluble matter—lint, rags, hair, grease, etc., leaving pipes clean and sanitary.

Enlist the services of this Pipe-Cleaning Specialist and save time, money and the good will of your customers. The wise plumber always has a supply of DESOLVO on hand ready for instant use.

Order DESOLVO and K.

Manufactu

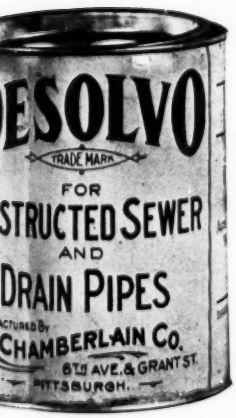
The Chamberlain Company -

K-K Cleans Closet Bowl

The Progressive Plumber Recommends and Uses DESOLVO

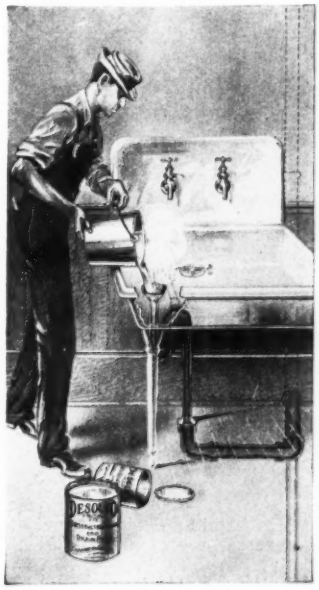
ne simple, speedy and effective cure for clogged or frozen pipes. ompletes the work in less time than it requires to get ready to other methods.

sy to use—Simply mix with cold water and pour into clogged pipe—DESOLVO the rest. Will not injure pipes or plumbing because it contains no acid. Can be y used on porcelain or enamelware.



The season is here when plumbers who do not use DESOLVO are having their troubles with frozen drains and stacks. DESOLVO, because of its intense heat, thaws pipes quickly and thoroughly.

NOW is the time to put in a large stock of DESOLVO, as all indications are that we will soon be compelled to raise the price, owing to the recent sharp advance in chemicals.



K. K. From Your Jobber

ctured by

- - Pittsburgh, Pennsylvania

Bowls the Sanitary Way

BUSINESS CONDITIONS, AS SEEN BY THE TRADE.

(Continued from page 469.)

lots, so that the trade is getting advantage of the rate.

The Pacific Sanitary Mfg. Co., whose factory is at Richmond, Cal., reports a very excellent year, notwithstanding the falling off in home building. This is due first to the demands made upon it by the Government for its products, and second because of the foreign business it is developing. The latter part of 1916, H. M. Friesleben made a tour of the Orient for this company and established a large number of agencies. The result of this trip has been made manifest by the constantly increasing number of orders received this year from the Orient, coming in through these agencies.

The Californian is just beginning to appreciate the comfort of heating in the home. Ten years ago there were few large buildings and fewer homes which had steam or hot-water heating. As this appreciation is growing rapidly, the manufacturers, despite the war, found their business growing this year up to the time when the Government began to regulate steel and iron prices. Since then there has been a falling off in the demand, due probably to the public expectation that lower prices may prevail after the first of the year. It is safe to say that up to September 1st the increase in the boiler and radiator business was fully fifty per cent in this State. With the falling off since that date it is impossible to estimate what the year will show in percentages, but there is no doubt that a substantial increase will be recorded for the entire year.

Our Louisville Correspondent.

A review of the heating, plumbing and allied trades of Louisville for the year shows that the trade was fairly busy, and did much better than had been expected, considering the fact that building was off throughout the entire year. Due to the high costs of building materials, fixtures, etc., there was very little residence work started and with the exception of additions to plants with government contracts of one kind or another, there was very little work on plants of any kind. Municipal building was at a standstill, with the exception of a big contract on the pumping station of the Louisville Water Co., which entailed expenditures of more than a half million dollars for buildings, and equipment. There was no school house building during the year, as the million-dollar school bond was run out in 1916. Apartment house construction was under normal also.

The largest building contracts handled during the year were the pumping station work, the new Riverside station of the Louisville Gas & Electric Co., costing about a million and a half completed; the coffee roasting plant of the Querbacker Coffee Co.; the Baptist Women's Training Home, and work was started on the new refineries of the Standard Oil Co., and the Aetna Refining Co. Some of this work is in the country and does not show in the plumbing or heating permits issued by the city. There was also some good residence work on the Upper River Road, and in other sections where no record was made in building statistics.

The one big event of the year was the placing of Camp Zachary Taylor at Louisville; this camp being erected to house approximately 50,000 men, and being equipped with first-class plumbing throughout. The heating contracts and metal work contracts were also fairly good ones. The plumbing was handled by Scherich & Meyer, composed of H. J. Scherich and P. H. Meyer, the latter representing the Louisville Master Plumbers' Association. This contract is estimated to have cost the government close to $500,000, while the profit to the plumbers amounted to something over $40,000. The heating contract for the base hospital, and a portion of the officers' headquarters, was handled by F. A. Clegg & Co., while the sheet metal work, was handled by Wagner's Sons, who put up the camp smoke stacks and did much other work.

Building permits for the fiscal year, September 1, 1916, to August 31, 1917, show that permits were issued for buildings costing $2,237,410, there being a total of 1,575 permits issued. This compares unfavorably with a total of 2,404 permits for construction to cost $4,080,430 in the 1915-1916 season, which was behind some of the previous years when permits reached five to six millions and more. There were no office buildings erected in Louisville during the year, and nothing of any real importance to swell the total. Several large contracts, upon which bids were received, were side tracked when the cost was ascertained, including the Louisville auditorium, for which the money has been raised, and a general railroad concrete storage warehouse.

The record of the heating and boiler permit department shows that in 1917 permits were issued for 51 boilers and 34 low-pressure boilers, at a cost of $75,000, as compared with 66 boilers and 44 low-pressure boilers, costing $95,000 in 1916.

Plumbing contracts for which permits were issued during 1917 were 1,759 permits, costing $292,247, as compared with 2,562 permits, costing $385,017 in 1916. By months the reports are as follows:

September, 1915..	222	$ 30,112	September, 1916..	198	$ 28,570
October, 1915.....	249	25,441	October, 1916.....	207	32,328
November, 1915..	213	46,591	November, 1916..	196	20,105
December, 1915..	131	41,748	December, 1916..	103	24,230
January, 1916	119	16,142	January, 1917	91	12,424
February, 1916 ..	141	18,624	February, 1917 ..	94	22,275
March, 1916	248	26,592	March, 1917	166	33,301
April, 1916.....	324	35,863	April, 1917.....	223	37,860
May, 1916	231	34,590	May, 1917	175	35,094
June, 1916	264	37,474	June, 1917	156	20,032
July, 1916	209	24,553	July, 1917	79	10,092
August, 1916	213	47,287	August, 1917.....	71	15,936
Total	2,562	$385,017	Total	1,759	$292,247

In handling the plumbing contract on Camp Taylor all of the journeymen plumbers and steamfitters of the city were kept busy for some four or five months in the summer, when things were slack, and a large number of the master plumbers also worked on these contracts, as superintendents and foremen, drawing nice salaries, which enabled them to make up for the lack of business at their offices. This resulted in a number of the master plumbers drawing enough money to largely make up for what didn't come in in the usual way, and at the same time keep going.

There were very few failures during the year, and a number of concerns made some money. During the fall months there has been a big demand for remodeling and repair work, heating repairing, gas fitting, etc., and everyone has been good and busy since September, there being a general shortage of good labor on account of the draft and the fact that many former plumbers have been attracted into other lines by high salaries offered. There were not many new plumbing concerns started in the district during the year, but several country shops were placed in operation, business in the rural districts, coal mining districts, etc., having been good. Agricultural counties have been very prosperous and farmers have been putting in water supply systems and improvements of various kinds.

In the jobbing and manufacturing end things have been

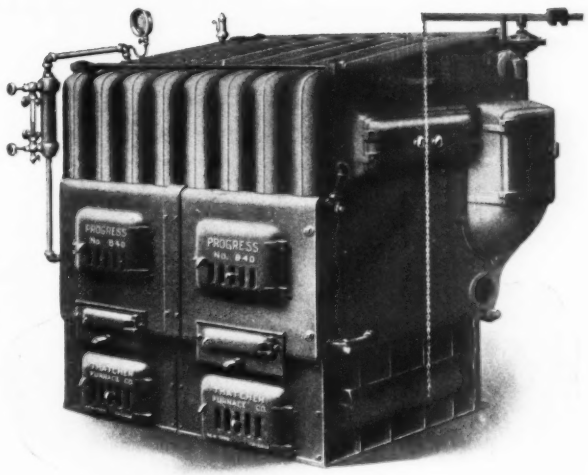
fair only. The Government Quartermaster's Depot at Jeffersonville has been buying fairly large supplies, and at present is spending several hundred thousand dollars in enlarging the plant. The Ahrens & Ott Works, of the Standard Sanitary Mfg. Co., Louisville, was very busy for months in supplying equipment to be used in the training camps established by the government, but car load shipments have been off for several weeks. The Columbia Sanitary Mfg. Co. and the Laib Co., have both had a fairly good year, while P. A. Vogel & Sons and the Ahrens & Ott division of the Standard Sanitary Mfg Co have both handled a good jobbing business. The Ahrens & Ott division has extended its business considerably during the year, having branched out into new districts.

The work of the Louisville Master Plumbers' Association during the year has been fruitful, and so has that of the Kentucky Association of Master Plumbers. The latter had an excellent convention, and the members are interested in the work, and in general improvemnt of the plumbing business. The local association has been holding regular meetings throughout the year, and has undertaken some big things, including an educational campaign through the daily papers to show the public the general improvement in plumbing and sanitation, and what the plumbers are striving to do in improving conditions. The association is also making a determined fight to have public comfort stations placed in the down-town district, and for better regulation of health safeguards. The organization is in a very healthy condition, and has a representative membership list among the largest plumbers of the city. The state association has been endeavoring to increase the use of septic tanks, and better sanitary arrangements throughout the rural districts, and the association work as a whole has been progressive.

Throughout the state there has been much improvement in many of the small towns, which have installed water works, sewer systems, etc. Numerous bond issues were passed in order to do such work, and it seems that the public is waking up to the advantages of better sanitary measures. There has also been a big improvement in the demand for plumbing and heating goods in connection with the sale of oil well supplies to the eastern Kentucky oil developers, who have brought the field forward during the past year, until it is now one of the principal crude oil production sections of the country. There are some big prospects in connection with oil development throughout the state, and opportunity for a number of concerns in such sections to handle oil well supplies.

All things considered the past year has been fairly satisfactory and has shown progress, although actual business has not been as good as in former years. With the cost of building some 30 to 35 per cent higher than three years ago, it is hard to convince the public that the present is a good time to build. However, the building trades, backed by the plumbers, have been working for several months on plans to launch a big building campaign in the spring, through a publicity or educational campaign to be run in the newspapers, and to show the public that now is an advantageous time to build and that labor and materials will not be cheaper until many years after the close of the war due to the certainty of a big European demand for American products.

There are not very many contracts being carried over into the new year, and the slate is practically clean. However, so much business was blocked during the past season that the plumbers and members of the building trades feel certain that it can hardly be put off much longer, and that there will be some good business to pick from in the spring. However, that is a gamble, and all that the trade



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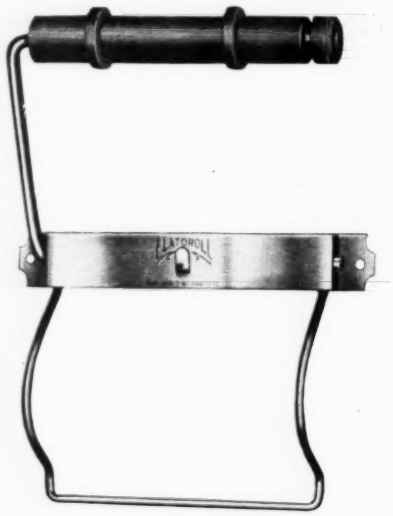

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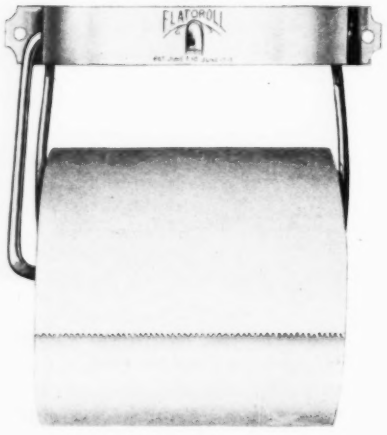

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can do just now is to sit still in the boat, practice a bit of conservatism on useless expense, and keep on its toes, ready for whatever may come along following the close of cold weather. There is never any new business opening to speak of until March in Louisville, as temperatures are too cold for winter building.

Our Cleveland Correspondent.

The value of building construction in Cleveland, which may be taken as an index of the amount of plumbing and heating work done, maintained a decided advance for the first nine months of 1917 over the same period of 1916. During October and November, however, the volume of building, in comparison with the previous year, fell off materially, so that the total for the first eleven months of 1917 was almost $1,000,000 below the total for the same period of 1916, being approximately twenty-nine and thirty millions, respectively. The figures for December may very easily wipe out this difference so that it may be said on the whole the value of building inaugurated during the year just closing is about equal to that inaugurated during 1916.

This, however, hardly expresses the building situation so far as contracting plumbers and steam fitters are concerned because, while the value of building remained about the same, the nature of the work done varied considerably. The feature of the building program of the past year has been the great increase in factory construction, while residences and apartments, housing construction of all kinds, has fallen off to little more than half its previous volume. This has resulted in a very serious condition for the plumbers, who have relatively little to do with a factory building and depend largely on residence work. It has been only by the most careful management that the plumbers have met these conditions successfully, and for the most part they have adapted themselves to the new conditions and maintained their establishments with little change. While few new firms of any importance have come into the field during the past year it is also a remarkable fact, under the circumstances, that practically none have gone out of the field. A few firms have taken this opportunity to expand their facilities and make preparations for the future, among which might be mentioned the Koblitz Plumbing & Heating Co. and Warden & Leese. It is not long ago that the Smith & Oby Co. moved to its present location.

As one prominent plumber expressed it, the problem has not been so much one of weathering a storm as of adjusting one's business to the new conditions. While the amount of work has been smaller, prices of labor and materials of all kinds have been higher and the money value of the business done has compared favorably with former years. Some firms of course have fared better than others.

Steam fitters have not been so much affected by the trend toward factory construction as the plumbers. Their work on a factory building is relatively larger than that of the plumber.

The trend away from housing toward factory construction is shown in the following figures covering the first eleven months of each of the years in question:

	1916	1917
Dwelling and apartment jobs	4156	2657
Manufacturing and storage jobs	310	388

The size of the average factory is indicated that the 78 additional bactories made up in money value for the decrease of 1499 buildings for living purposes, a ratio roughly of 1 to 19.

Following are the number of building projects under the

classifications: Public buildings, schools, theaters, hotels, stores and office buildings, all of which affect the plumbing and heating trades to a greater or less degree: 1916, 150 projects; 1917, 109 projects.

This trend from dwelling to factory construction and the abnormal condition created thereby have been due to a number of causes, all traceable directly or indirectly to the war conditions.

In a general way these conditions have been operative ever since the outbreak of the war in Europe over three years ago, so that they are not altogether new to the Cleveland business man. However, they have been greatly accentuated since last spring by our own domestic war problems. Ever since Cleveland became one of the principal munition centers of the country three years ago, the demand for factory space has been constant and insistent and limited only by the supply of money, men and materials. Although money was tight for business loans, big businesses with war contracts did not hesitate a moment to make construction loans on all their unencumbered property. This diverted practically all the usual quota of money held in Cleveland banks for construction purposes to factory construction, leaving at times absolutely nothing for the building and loan companies and the man with a lot to build upon. The situation was further aggravated by the fact that much of these funds borrowed as construction loans were used, with the cognizance of the banks, to finance large war contracts. When these contracts were delivered and paid for other contracts were closed and the money used to build still larger factories for still more war orders. It was in this manner that the first Liberty Loan money subscribed in this district quickly found its way back into the channels of trade. During the second Liberty Loan money was a little tight, as banks were instructed to hold larger reserves than usual, until the success of the loan was assured. At present, however, the situation is easier and the second Liberty Loan is now flowing through the Cleveland clearing house at the rate of $12,000,000 a day, against $10,000,000 for 1916, $8,000,000 for 1915 and $4,000,000 for the period before the war.

The result has been an enormous influx of industrial population and no adequate steps taken toward a proper housing of it. Merely as an example, the influx of negroes from the South amounted to 20,000 over the period of a few months, and many other strata of society in about the same proportion. Rents have been raised on all classes of apartments and dwellings, and no living quarters below $40 a month are available anywhere. The housing problem has been the most important in Cleveland for almost a year, and while there has been much talk on the subject all attempts to remedy the condition, and some of them very ambitious, have gone to pieces on two things: 1, the lack of money for construction loans; 2, the bugaboo of high prices, and the hope that they may come down in the new future. Practically all building of dwellings up to date has been by people who have money in hand to complete them. The speculative builder, who in ordinary times is depended upon to build a large majority of the dwellings, is out of the market for the above-named reasons.

The need for housing, however, is very great and this condition alone has served to keep the volume of building up where it is. But abnormal measures have had to be taken to achieve this result. The industrial and commercial leaders of the city were quick to realize that lack of housing seriously threatened to dwarf and stunt the in-

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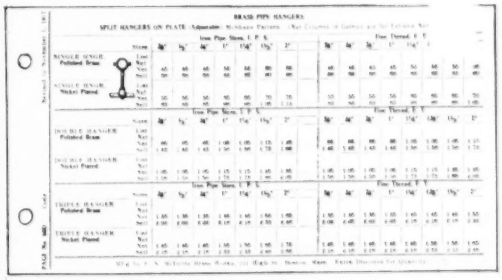

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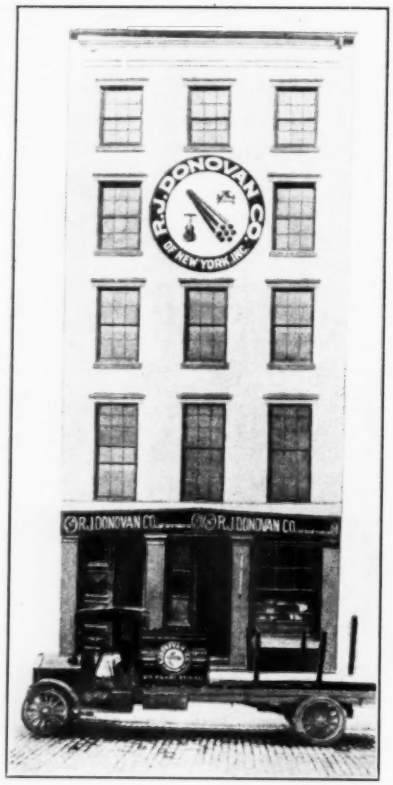

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dustrial growth of the city through lack of labor, properly housed and contented.

The Chamber of Commerce, the city administration and some of the largest manufacturers have undertaken to deal with this problem through a co-operative building organization, which will build workingmen's dwellings on a large scale, and the very necessity for this sort of thing promises to make it a success.

In the meantime efforts have been made by the Real Estate Board and others to jolt loose the speculative builder, who has money in hand but who is waiting for prices to come down. Men prominent in the building and real estate world have had little difficulty in proving that with war conditions upon us and after-the-war conditions coming, prices are not due to come down for years and perhaps many of them, and in the meantime rich opportunities for rentals are being let slip. The larger firms in this section are not letting any grass grow under their feet, but are buying and building and making hay while the sun shines, so that after the war they will be ready.

Looking into the future a prominent heating contractor said: "I look for traffic conditions to be the greatest problem in our business for the near future. If we can get the material and get it when we want it, there will be plenty of work for everybody, but I am afraid that between traffic conditions and the relative scarceness of metal on account of war needs, the first few months of the new year will not be so successful. This condition ought not to last beyond August."

Another heating contractor said: "There is no doubt about the need for building and housing of all kinds in Cleveland. The first question is, can it be successfully financed and started under war conditions, and secondly, can we get the material when we need it?"

Both plumbing and heating contractors of Cleveland are satisfied with conditions during the past year, considering the circumstances, and look forward to the future with optimism.

Our Cincinnati Correspondent.

Conditions in the plumbing and heating trades during the year have reflected building conditions and these in turn, have kept closely in touch with the various developments growing out of the war, especially after this country got into the conflict. Likewise, prospects for the coming year are so closely connected with the war that any attempt to predict developments aside from the progress of the war would be almost impossible. Various members of the trade report somewhat varying personal experiences during the year, as the case usually is. For instance, contractors fortunate enough to secure large jobs, requiring constant attention over a long period, had a good year; those who had to rely upon the small work appearing in the general market did not do so well, for obvious reasons. This condition, a reflection of a somewhat depressed state of the building market, is the reverse of that in really busy times, when the trade as a whole is kept busy by the work of the general market—the small jobs, such as residence work and the like, which serve to keep things moving with everybody.

Moreover, there have been comparatively few big building jobs under way in the city during the year, as far as the plumbing stage of the work is concerned. The two biggest jobs of 1916, the court house and the Hyde Park high school, are still under way, and bid fair to take the greater part of 1918 for their completion, including the bulk of the actual work on the plumbing, heating and ven-

tilating systems. There have been no other jobs started during the year to compare with these; and the several structures which, from the standpoint of size, were somewhat in the same class, involved comparatively little work for the plumbing contractor, as they were mostly factory buildings.

There has been a considerable amount of factory work during the year, especially in the way of additions to existing plants. This indicates accurately the activity going on industrially in Cincinnati, and it is worth noting that two leading manufacturers of plumbing supplies, the Douglas and Pfau companies, were among the concerns which made arrangements for increasing their space and facilities. Manufacturers in most lines have had an extremely busy year, and the great machine-tool concerns have been taxed to the utmost to keep within sight of the demand for their goods. This has served to bring an abundant supply of money into the city, and to reduce unemployment to the minimum; but it has not exerted the stimulus on building which it undoubtedly would have done in normal times, for the reason that these are not normal times.

The natural result of the war, and of the immense demands of the Government in men, money and material, has been a tendency toward extreme conservatism, taking the shape, as far as building work is concerned, of postponing everything that is not of pressing necessity. This, of course, has tended to cut down the amount of building, and has brought about the limited volume of work referred to. While there has been some factory work, as indicated by manufacturers who had to have the additional space, and while there has been a fair amount of residence work, as well as the usual volume of repair business, the total volume of work during the year is below what might otherwise have been expected. The war can take the blame for this, as for a good many other things which are not as usual.

The large sums of money which have rolled into Cincinnati in payment for war materials, army supplies and goods for the consumption of the general public, have helped in a large part to swell the contributions to the Government's needs, through bond subscriptions and taxes, and have also been drawn upon liberally to take care of the various relief activities conducted by official and semi-official organizations, such as the Red Cross. The plumbing and heating trades have done their full share by contributions to these causes, and may take credit for the splendid showing the city has made in the two bond issues, with over $75,000,000 of Liberty Loan securities purchased here, and in the big sums raised for the Red Cross, the Y. M. C. A., and so forth.

But this does not help building much. That is a condition which the trade has become resigned to, as a matter of necessity, taking it as a part of the war's burden for them, and acting accordingly. That the government itself is inclined to limit building work to that which is absolutely necessary is indicated by its recent ruling virtually prohibiting the movement of structural steel above certain sizes, except for essential construction, as a measure of conservation for railway rolling stock. In Cincinnati, for example, this has absolutely put a stop to work on the Dixie Terminal building, one of the most ambitious projects of several years. Excavation of the site for the building was finished, and the company promoting it was ready to proceed, but inability to get the steel made it impossible to go ahead.

"We're in the war, and we have to accept these things, just as the boys in the field accept the chances, or the fact, of wounds and death," is the way a leading master plumber of Cincinnati put it recently. "It is hurting busi-

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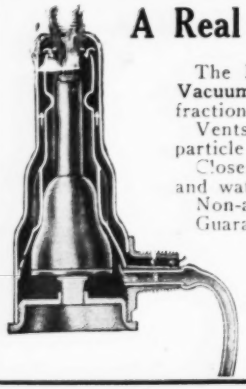

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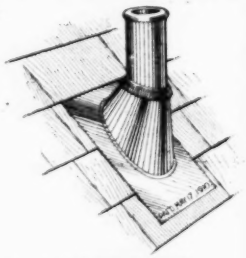

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ness, of course, for people to be putting their money into war bonds, war relief work, and so forth—but it is hurting other businesses than ours, and we can't kick. There are plenty of cases where, on the other hand, the war has definitely boosted the plumbing business, as in the cities where the cantonments have called for an immense amount of work. It all goes together."

In that connection, it should be mentioned that several Cincinnati concerns in the supply trade have benefited directly from government orders, which have gone far toward making up for the loss of other business. The trade in general, however, especially the contractors, cannot boast of a big year.

Our Boston Correspondent.

Massachusetts plumbing and heating contractors pride themselves on being an "optimistic bunch." Just now with war conditions seriously hampering all lines of industry, except those directly or indirectly engaged in production of war materials, it is sometimes hard to keep that optimism to the fore, but nevertheless most of them are doing so.

Several circumstances or combinations of circumstances have served to keep the plumbers and steamfitters busy during the past year notwithstanding that the falling off in building has been very noticeable, and while the outlook for 1918 is not as rosy as many could like to see it, there is likely, in the opinion of most of the men of the trade, to be enough work of one kind or another to go round.

The falling off in home building, due to the tightening up of the money market and the general trend toward economy, as well as to the high prices of building materials, has been offset by the increase in mill and factory work.

War work of one kind or another is engaging the attention of manufacturers in nearly every line, and many are finding it impossible to turn out the work fast enough, even with day and night crews. As a result factory additions and new establishments are springing up on every side with almost alarming rapidity, and in the vigorous New England climate they must be provided with good heating systems while sanitary regulations demand modern plumbing. This class of work is likely to continue so long as war continues.

Then again there is the straight government work. In New England the "big" job of course was the national army cantonment at Ayer, work on which has only just been completed. Then there have been numerous other smaller camps to be prepared, and many armories have been renovated for use by home and state guard companies that have been organized to take the place of the national guardsmen called into federal service.

The usual amount of repair work, work that must be done regardless of cost or money conditions, also has helped to keep the men busy; and with the coming of cold weather heating departments have been called upon.

The call to arms has been seriously felt in the plumbing and heating trades, and there is hardly a master plumber in the state, who has not lost one or more members of his crew, and oftentimes of his own family, through enlistment or draft. The high wages paid by munition plants and on army work also has called men away from the plumbers and fitters. This has been particularly so in the matter of steamfitters. By working overtime and on Sundays steamfitters at the national army cantonment, at the big shipbuilding plants and on other government work have been able to earn $70 to $80, and sometimes more, each week, and as a result many have left their old employers to work at these plants.

James S. Cassedy, of Cambridge, Mass., former president of the National Association of Master Plumbers, discussing business conditions with "Domestic Engineering's" correspondent said: "Personally business is good, but this is due more to what might be termed emergency war work, such as factory additions and similar work, than to anything else. This class of work is likely to continue for some time to come, but normal work—by that I mean speculative building, apartment houses and dwellings—has received a very serious setback with no immediate prospect of improvement. There are many builders, who undoubtedly would be willing to take a chance even with the price of building materials where it is, but there is no mortgage money in sight. People have invested in Liberty Bonds and other war securities and the result has been a tightening of the money market. Until money conditions change there is little prospect of a resumption of building, other than necessary mercantile work."

John W. Zehringer, who conducts a large plumbing contracting business at 185 Essex Street, Boston, described conditions as they affect him. "I'm very busy. I've got all the work I can handle until next July. I have plenty of help and plenty of work," said Mr. Zehringer. Asked regarding prospects for new work he said: "Personally I have no new work in sight. I'm not figuring anything and I don't want to for it will be months before I could tackle it."

Our New York Correspondent.

Building construction in New York has fallen off during the year to a point where its close finds a winding up of practically all immediate operations of any account, excepting a rather healthy activity in factory extension in districts adjacent to the city proper. Yet there is a pronounced shortage of housing facilities in and around New York. Supply has not kept abreast with natural growth because the necessary funds have not been available for that class of building. Lack of courage in the face of a skyward moving market is the cause advanced on all hands.

That is the condition as it stands today. However, despite the notable lack of activity and the almost total absence of any prospective operation for the immediate future, men in the trade, who have always been known for their conservative judgment are not inclined to accept the present situation as a fair reflection of what may be expected for 1918. Whether or not the tremendous Government expenditures now under way for war purposes and the billions to be disbursed during the coming year in the same direction, with its sure attendant, general prosperity, will find its way into building investment is highly problematical, though this is freely grabbed at as a solution.

The theory is also advanced that the federal control of prices and commerce will have a stablilizing effect as soon as this machinery of the government is in smooth running order, that it will restore the confidence of investors, and adjustment to the inevitably higher building costs will follow.

For the present of course, and until the war ends, everything will have to be subordinate to the successful prosecution of the war. The trade understands that thoroughly and is falling in line to carry its share of the burden.

The Swetland Heating & Appliance Co., of Cleveland, Ohio, has been incorporated with a capital of $25,000. The incorporators are: W. D. Valentine, T. M. and F. D. Swetland, and L. B. Peck.

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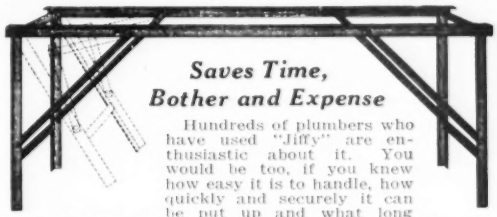

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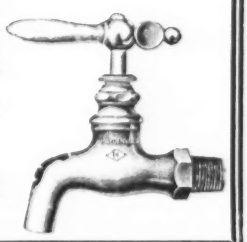

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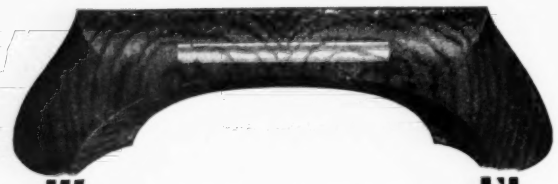

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Closet Seats

They are solid walnut throughout and the illustration above shows the solid construction—a hickory dowel securely fastened in with U. S. Gov't. airplane glue.

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in closet construction is the new

Maddock Syphon Action Vitreous China Hopper Closet

Operates with very strong action.

Has unusually large opening throughout trap.

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A special feature of this closet is the large surface of water and deep water seal. For about 12-inch roughing, with low tank.

Write for literature and prices.

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The Metal Market

The Steel and Iron Market in 1917.

At the end of 1916 the steel market was suffering because of the tremendous business taken at levels, which at that time seemed to be high. Mills were operating at their fullest capacity. Orders for forward delivery were being taken on in large amounts, and altogether the situation had never been equalled before. Large tonnages for shell manufacturing purposes were being booked, and demand was also large for ship plates from both foreign and domestic builders. Prices were being advanced almost daily, and there appeared to be no limit that consumers would pay for prompt delivery. Many mills declined to give quotations as they were unable to accept further orders for 1917 delivery. Railroads were ordering large numbers of locomotives, and foreign orders for both locomotives and cars were being placed almost daily. Sheet bars sold at Pittsburgh at $65 a ton, which was thought to be a high price. This condition continued until the latter part of August, when sheet bars were selling at $105 to $110 a ton and other steel products in proportion. The large demand by the government for steel of nearly all descriptions helped for a time to accentuate the seriousness of the situation and it was finally determined that the only proper way to prevent actual panic was for the government to fix prices. This was finally accomplished and announcement made to that effect on September 25th, fixing the price for bars at 2.90 cents, for shapes at 3 cents and for plates at 3¼ cents. These prices applied to the requirements of the Allied governments as well as for those of our own government and private consumers as well. But the needs of the government and Allies were to have precedence over every one else because of the necessity of the situation. Production continued throughout the year upon a tremendous scale and was only cheked towards the end of the year because of a shortage of fuel. Railroad congestion also interfered with production and in some cases, even as early as February, steel works were required to bank their fires because of the lack of coke. This transportation problem continued throughout the year more or less, and all efforts to relieve this phase of trouble were unsuccessful, although some relief came when embargoes on unnecessary articles were announced in the autumn. Further price fixing for steel products was announced on October 12 and included nearly all branches of the industry. Pittsburgh and Youngstown, Ohio, were the bases, and blooms and billets (4 by 4 or larger) were priced at $47.50 a gross ton, billets (under 4 by 4) $51; slabs, $50; sheet bars, $51, and wire rods, $57. The last month of 1917 finds steel production seriously interfered with by circumstances beyond the control of the mills, and uneasiness exists throughout the trade. The lack of fuel, particularly coke, is one cause of anxiety, and other weaknesses have been a lack of efficient labor and transportation facilities. Mills having their own iron plants are banking their fires and getting what iron they can in the open market. But sufficient tonnage has not been found. Government work absorbs more and more of the output of the mills, fabricating shops and plants developed to the metal manufactures. Throughout eastern Pennsylvania and the Central West the rolling mills are receiving orders for material, which may tax

their capacity. Shell forgings and ship steel alone comprise upward of 230,000 tons, and other orders for plates and sheets aggregate 50,000 tons, some of which is to be exported to the Allied nations and the remainder used in the building of submarines and smaller naval craft. American railroad rolling stock is so scarce that efforts are being made, with the co-operation of the government, to add to domestic road equipment and the government will probably plan orders for a number of locomotives.

Heavy buying orders characterized the pig iron market at the end of 1916, many being for foreign delivery, especially for Italy and Spain at what seemed then to be very high prices, viz.: Bessemer $37 a ton seaboard. No. 2 X Northern foundry was selling at $29 to $30 a ton, with large orders for 1917 delivery. Demand both for foreign and domestic account continued heavy, in fact, unprecedented for several months, and prices advanced accordingly almost weekly until the climax was reached in September when pig iron No. 2 X Northern foundry was quoted and selling at $55. The demand was greater than the supply at all times, and consumers were simply compelled to pay the advanced price or else fall down on their contracts. Transportation or rather a lack of transportation facilities played an important part with producers of pig iron. Thousands of tons of iron were tied up in railroad yards at the beginning of 1917 while buyers were clamoring for supplies. Railroads placed embargoes in all directions and the yards were so choked that freight of all descriptions was declined. But gradually this situation was cleared up in a measure at least and freight movement was easier after a time. Foreign demand continued heavy, but ocean freight rates advanced by leaps and bounds until they were almost prohibitive and this together with the inability to obtain ocean bottoms put a barrier against foreign business for a time. The lack of coke caused by the shortage of cars and locomotives compelled furnaces to operate on a hand-to-mouth basis early in the year. The beginning of the war with Germany in April found the furnaces at their apex of efficiency due to European demands, but production was seriously hindered because of the railroad congestion. Prices were advancing all the time until the government fixed the price of basic and No. 2 iron at $33 a ton furnace in September. Problems presented themselves for solution even after this. One of the greatest was how to produce and procure sufficient iron to meet existing obligations. The furnaces were almost fully sold up for many months ahead, and as time went on the situation between producer and consumer grew more precarious. The sudden and radical reduction in the price of iron from $50 to $33 per ton had a pronounced effect in that it influenced the producer to work off the higher price contracts first and some of those who thought themselves covered found that, if they were to get any iron at all they would have to wait longer than they expected. But while production held up in comparison with former times, it was altogether inadequate to meet the ever-growing demand. Furnaces in some quarters were compelled to go out of blast in November because of the lack of coke, and instances of this nature could hardly come at a more inopportune time, when every owner of energy is needed to meet national and public requirements. Demand for steel making and foundry grades continued up to the last month of 1917. It is all the more pronounced because of the scarcity which makes it impossible for furnaces to come anywhere near meeting. Recognizing the seriousness of the situation the foundries are placing all the orders for 1918's delivery that they can induce the furnaces to accept. Not only is iron

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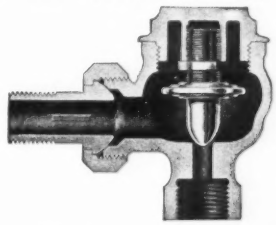
For Radiators and Coils of "Low Pressure" "Vapor" and "Vacuum" Heating Systems



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The Marsh Reflux Junior Thermostatic Trap is recommended for small radiators and coils. This Trap for the small and the Original Reflux for the large units will make an ideal job.

Especially adaptable for two pipe gravity work and vapor systems.

May be furnished either concealed adjustment (as illustrated) or with outside adjustment.

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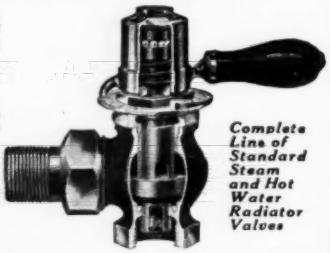

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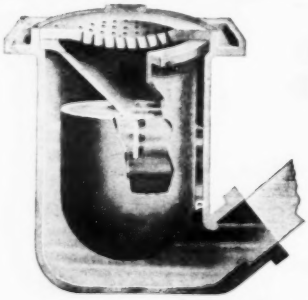

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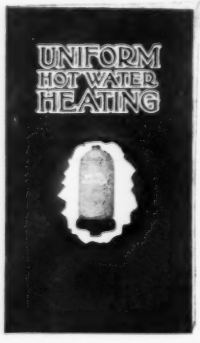

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This generator increases circulation and radiation. Prevents sluggish, water-logged conditions. Reduces fuel cost. Operates without noise. No attention needed.

Just what you want for that next job.

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scarce, and not only do the furnaces decline further orders until they are sure of the coke necessary, but even when shipped there is no telling when it will reach its destination. Whether the Fuel Administration can devise some means of increasing the outturn of coke and expediting the distribution, while the present difficulties in way of transportation exist, remains to be seen. All that can be done at present is to hope for the best.

Copper in 1917.

At the end of 1916 practically all of the large domestic consumers had contracted for the first half of 1917 requirements, against which they in turn sold finished products based on costs that appeared to be high at that time. The ruling prices at that time for electrolytic were between 30 cents and 35 cents. Producers were well sold up and possessed vast funds in the form of surplus earnings and were in a position to furnish the strongest kind of resistance to depression, but events forced higher prices almost immediately, after the year 1917 began. Traffic delays became a factor in forcing copper prices to higher levels, and the German note stating that that country would sink neutral vessels threw the copper market into confusion, sellers withdrawing quotations. Prices advanced to 37 cents a pound when in the latter part of March announcement by the Council for National Defense was made that producers were to supply the Army and Navy Departments with 45,000,000 pounds of copper at a price of 16.6739 cents, which caused consternation. However, prices to other consumers remained around 35 cents but receded gradually, caused by freer railroad movements. War was declared early in April and copper demand ceased for a time following the declaration. It was felt that copper producers would be compelled to supply the Government with metal at an inside price and would also have to give similar preferred treatment to the Entente nations. This afterwards proved to be the case and readjustment was made necessary. The Government bought 60,000,000 pounds in the latter part of June at 25 cents, which had the effect of strengthening the market, as it was so much higher than the previous purchase that it served to hold the outside market up. However, the probability of the establishment of a uniform price caused the market to sag materially in July, until copper sold as low as 24 cents. The market continued dull practically all summer until the purchase of 77,654,000 pounds in September for the Allied nations by the United States Government at 25 cents a pound, when strength developed. But the copper market sustained a severe shock when the Washington announcement, fixing the price of copper at 23½ cents a pound, was made. Business came to a halt and it was difficult for the business to settle down to the new conditions. As the year closes order is coming out of chaos, and things are shaping themselves so that dealer and consumer are getting a square deal. Government requirements remain heavy and are likely to until the end of the war. Production is estimated for the year 1917 at 2,700,000,000 pounds against 2,500,000,000 pounds in 1916.

Tin in 1917.

Tin was the one metal that did not profit by reason of the war prosperity, but it is expected that it will enjoy a wide-spread demand with high prices, as soon as the war terminates. Germany and Austria, large consumers of tin, have been unable to obtain supplies except in small amounts through Holland. Thus the removal of the blockade would bring these two countries into the market for tin. The English consumers, especially the Welsh tin plate makers, who have been forced to give up most of

their business, owing to war conditions, will also begin to seek supplies. At the commencement of 1917 spot Straits tin was selling at 42½ cents, while spot Banka was quoted at 41¾ cents. During the year shipping from the East was so unsatisfactory that the market for tin was extremely handicapped for want of shipping tonnage. The fear of submarine activity was ever present and became a cause for nervousness on the part of both dealers and consumers. Arrivals were far below normal for most of the time and in March resulted in tin importers holding metal that would arrive in order to obtain the premium that was asked for spot. Prices advanced as high as 80 cents, which was nominal, as no tin was available early in December. Stocks at the close of the year are very low, and it can hardly be said that there is a market because of the lack of tin for commercial purposes. Insurance rates were advanced in April from 3 guineas per cent to 5 guineas per cent. Before importers had been paying another 3 guineas per cent from Singapore to London, and still another 3 guineas per cent from London to New York, but the new rates provided a charge of 5 guineas in both cases and equalled 2 cents a pound advance for tin. Besides all these difficulties all tin allotted to the United States is subject to permits issued by the London Rubber and Tin Exports Committee. On the whole the situation is not healthy, and the trade is somewhat demoralized and expects no permanent improvement until the war closes.

Lead in 1917.

Lead fluctuated considerably during the past year. The prevailing price at the end of December, 1916, was 7.75 cents. During the year it sold as high as 12 cents and in early December the quotation of the leading producer was 6⅝ cents. In the last days of June the Government bought 8,000 tons and fixed the price at 8 cents, but at the time the general market was not affected. However, prices did recede gradually and the end of the year finds the quotation almost at the lowest. Production was large and the Government was a heavy buyer after June.

Spelter in 1917.

The end of 1916 found the spelter market demoralized because of the German Peace proposals. The going price, previous to the announcement of the German Government, had been around 13½ cents, but a drop of 2 cents was made during the last of December. Government purchases of various grades have been large and the price satisfactory to producers. The tendency throughout the year has been downward, and in the last month of 1917, spelter was freely offered at 8 cents for all positions, but the actual selling price was 7¾ cents.

C. V. KELLOGG SELLS INTEREST IN THE P. B. & P. MFG. CORPORATION AND BUYS ENTIRE INTEREST IN THE KELLOGG MACKAY CO.

C. V. Kellogg, president of the Kellogg-Mackay Co., of Chicago, has just announced that he has sold his interest in Pierce, Butler & Pierce Mfg. Corporation to Eastern business men and that he has acquired the entire interest of the Kellogg-Mackay Co. It is said that the transaction involved approximately $1,000,000. The Kellogg-Mackay Co. will continue to handle the same line of boilers, radiators, plumbing and heating supplies.

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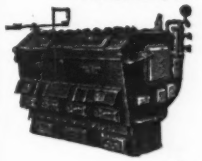

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Use it on old as well as new work.

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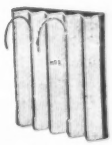

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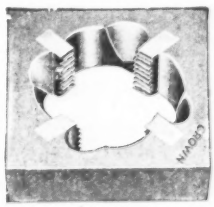
Guaranteed Tools and "Easy Cutting" Pipe Dies

"CROWN DIES" are "SCIENTIFICALLY MANUFACTURED." The teeth are "MILLED" not merely tapped as the ordinary Die. This is why "CROWN DIES" are the "Easiest CUTTING" Dies on the market. They are the "BEST" Dies made and in the long run the "BEST" are the "Cheapest." Therefore, when ordering dies specify and insist on "CROWN DIES."



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Saves Figuring

That means saving time and time means money.

The Alexander Table of 45 degree Offset Measurements, enables you to tell at a glance any measurement desired from ⅛ inch to 21 feet, increasing by eighths.

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Size, 3½x5 inches. Bound in leather.

Also in chart form 2 ft. x 2 ft
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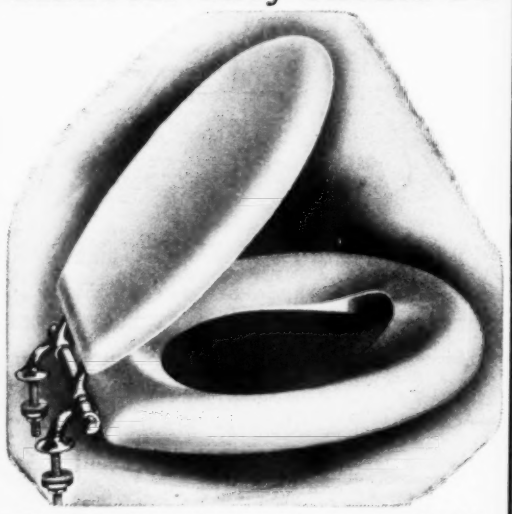

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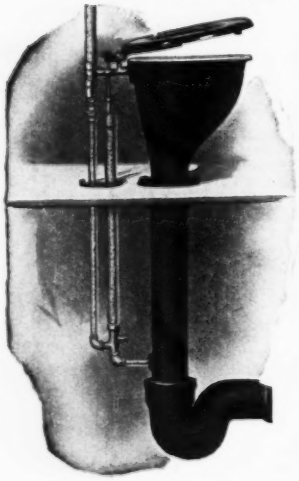

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Straight Back Enameled Rim Hopper.

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The best frost-proof closet money can buy, at a price that warrants its use on any job.

Furnished with or without soil pipe.

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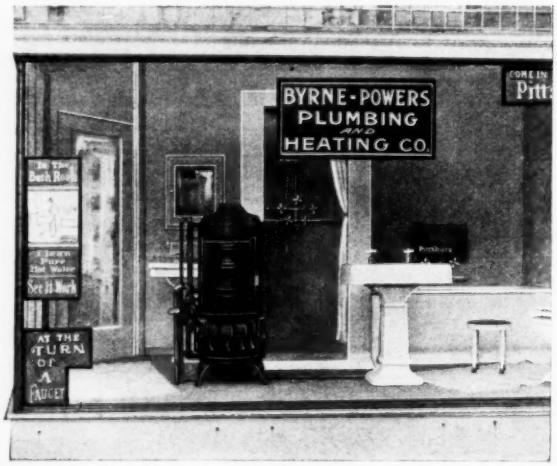
Pittsburgh, Pa.

Massachusetts Master Plumber is Re-elected Alderman in City of Quincy.

William A. Bradford, past-president of the Massachusetts Master Plumbers' Association and one of the well known men of the trade in the United States, was recently returned for a second term as alderman in the city council, of Quincy, Mass., which has long been his home town. Last year was his first term as a city father, and he proved himself a most competent councilor. He took a broad view of all questions under discussion and made a careful study of the various matters which concerned the progress of the city. His friends in the plumbing business in all parts of the country will certainly wish Alderman Bradford a successful year in the aldermanic harness.

Co-operation More Successful Than Competition in Sale of Water Heaters in St. Joseph, Mo.

That the plumbers of any thriving city can co-operate to advantage in the selling of water heaters, was conclusively demonstrated recently in a co-operative water heater campaign carried out successfully by the master plumbers of St. Joseph, Mo. They agreed that co-operation would sell more water heaters than competition, and they therefore decided to pool their lists of prospects, and have a central display room. The Byrne-Powers Plumbing & Heating Co.'s establishment was selected for this purpose and the lists of prospects pooled and duplicates



Co-operative Display of Water Heaters at St. Joseph, Mo.

were discarded. A mail order campaign was also started, a well known manufacturer of water heater furnishing the literature, supplemented by newspaper and bill board advertising. Two of the company's Kansas City salesmen were placed at the service of the plumbers with instructions to assist them in their follow-up work. As the window display at the central display room was of vast importance, each plumber had his idea as to what would attract the pedestrians, and as a result of these suggestions, the window was well dressed, and it played its part in the campaign. The results of the campagin were checked up and each plumber received credit for the sales made to the list of prospects that he furnished. This campaign it is said, proved conclusively that the plumbers can co-operate on sales campaigns to advantage, and with this co-operation and the help of the manufacturers, they can make more sales than if they work on a competitive basis.

A MERRY CHRISTMAS TO ORDER.

(Continued from Page 435.)

apartments which were occupied announced everything warm and comfortable—not a single complaint to make

Completely mystified, he betook himself to the janitor's quarters.

"What's the matter, Sam?" the Colonel demanded "You must be burning all the coal there is in the bins."

"Dunno about that, Boss. Is everything satisfactory otherwise?"

The Colonel was obliged to admit that it was. To assure himself, however, he looked at the coal pile, but could not tell whether or not it was vanishing with greater regularity than usual. Further questioning failed to get any vital information from Sam as to how the unusual condition was brought about or what the probabilities were that it would be maintained.

Despite the fact that wintry weather alternated with blizzards continued for several days, the Homecrest Apartment remained by day and night as warm as the most critical tenant demanded. Although it was far from the regular moving time, yet the news spread among prospective renters, and it was not long before the Colonel's agent was pleased to announce that he had calls for more apartments than he could supply. The Colonel was seen consulting with every one who might be able to give him any information, but if he learned anything he was careful to keep the result of his findings a profound secret.

IV.

December 20th, the day set for the much heralded suit at law between Colonel Carter and Burke & Co. saw the court room well filled with a large number of people interested in the outcome of the suit. Colonel Carter was known to be shrewd in the prosecution of any case in court in which he had an interest, while John Burke was known as one of the most stubborn of fighters. Each had a firm of leading lawyers employed and each had spent considerable money in retaining every possible witness who could know anything about the matter.

As the clerk announced the case, the Colonel arose in all his majesty and addressed himself to the court.

"I am quite aware," he said, "that the simple announcement that our side refused to prosecute this case might work a hardship upon my respected and honorable opponent. Therefore, I crave the court's permission to make a statement in the matter which will in a measure explain my withdrawal from this case."

The court, noting that the Colonel evidently had a speech bottled up that he wished to release, glanced significantly at the clock and remarked, "Very well, but make it as short as is consistent with the facts in hand."

Thus admonished, the Colonel proceeded. "As you know, the difference between myself and Mr. Burke," here the Colonel bowed towards his erstwhile adversary, "has been long standing and bitter in character. I myself have been guilty of helping to divert a fair share of business elsewhere—something that I would not have done, had I been possessed of the true facts in the case.

"It seems, gentlemen, that I placed too much reliance in my old-time servitor, Sam. Sam, whatever his virtues or faults may be, knows nothing about the vagaries of this northern climate. Under his manipulation, the most excellent system installed by my friend Mr. Burke has failed utterly to afford satisfaction. However, I am greatly pleased to inform the court and the others, who are interested in the matter, that when his son, John Burke, became interested, he was at once able to give

RELIABLE
Vacuum Heating Equipment

The Universal Trio—

Air-Line
Return-Line
Vacu-Vapor

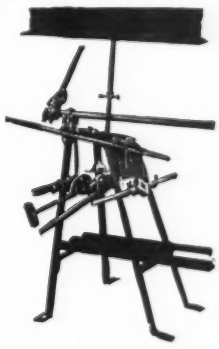
cover every steam heating requirement.

Before deciding upon the equipment for your next heating contract, write for literature and full information concerning the complete, up-to-date RELIABLE Line.

THE BISHOP-BABCOCK-BECKER CO.
Factories and General Offices, CLEVELAND, OHIO
New York Chicago Cincinnati St. Louis
St. Paul San Francisco Atlanta Dallas
Milwaukee Denver Boston Philadelphia

The Standard Portable Vise Bench *and* Pipe Bender

is now used by thousands of satisfied customers. You will eventually use it, too. Pays for its cost on first job and keeps on cutting your labor costs.



This ad Is our Salesman

Better write now for facts and let us prove it to you.

Standard Iron Works
508-510 E. 74th Street, New York

MARTIN VISE STAND AND PIPE BENDER

is the only portable device of its kind.
No fastenings needed—will not upset, tilt or skid. Can be dissembled and packed in half a minute.
Light, compact, easy to carry as a suitcase.
Order one on 10 days' free trial.
H. P. Martin & Sons, 621 East 2nd Street Owensboro, Ky.

No. 315

ALL WHITE RIGHT

Vitreous China Bath Room Fixtures. Write for Circulars and Discounts.
Made and Guaranteed by
Bay Ridge Specialty Company, Inc. 5813 First Ave. Brooklyn, N. Y
Originators of this type of Bathroom Fixtures

HW

Change your Hot Water and Steam plants to a

Hutchison System of Vapor Heating

at Small Cost

You will have a perfect heating plant.

HUTCHISON VAPOR HEATING CORPORATION

Woodward Building,
WASHINGTON, D.C.

Send for a Catalog

TRADE MARK SIGNET REG. U.S. PAT. OFF.

No More Back Water

where the SIGNET Drain is used.

Keeps basement dry, clean and sanitary. A positive safeguard, either wet or dry, against sewer gas and water.

Brass working parts submerged—works automatically by gravity.

Always works. Always satisfactory.

Write for literature.

CRAMPTON-FARLEY BRASS CO.
KANSAS CITY, MO.

SMOOTH-ON JOINTS TRADE MARK REG. U.S. PAT. OFF.

SMOOTH-ON

IRON CEMENT No. 5

For making hub joints on cast iron soil pipes, gas and water mains.

EASY TO APPLY

Difficult joints quickly and easily made.

For sale by supply houses.
Send for our illustrated instruction book.

SMOOTH-ON MFG. CO., 570 Communipaw Ave. JERSEY CITY, N. J

Chicago Office, 221 N. Jefferson St.

Sam such a thorough course of training that he is now able to afford the most perfect janitor service possible. This has, I may say, been a most simple solution to a problem which has been vexing us for some considerable time. Now, despite the inclement weather I am pleased to announce that the Homecrest apartments are suitably maintained and I offer apologies all around to those who may have been adversely affected in the matter."

The court looked gravely over his spectacles and indicating the principals to the law suit, said judiciously: "Gentlemen, I would suggest that court be adjourned for a few moments and that a further consideration of the matter be taken up at once."

V.

Christmas day was fittingly celebrated by Burke and Co.,—for that is the way the firm name read from Christmas day on. The elder Burke graciously admitted that it is a part of any business to see the job through, and while he has not come to the point where he is willing to open a training school for janitors, yet he frankly admits that even a good pointer may be gotten from an inexperienced man—particularly when that man is his own son and interested in the welfare of the business.

WHEN THE CHINESE MADE A MISCALCULATION.

Thomas Sammons, United States Consul General at Shanghai, reports to the Department of Commerce that prior to the present war China had contributed largely to the supply of antimony, and the Chinese, considering the exceptional demand that would be created for this mineral for use in the manufacture of ammunition, proceeded to the further development and extension of production there. For a time this mineral was in prime demand, and the Chinese were able to dispose of all their output at satisfactory profits. Much of this mineral was accumulated, it is understood, by speculators in the hope of making future sales at increased profits.

But these speculators and dealers, it is reported, failed to take into consideration the impetus that would be given to the antimony industry in other parts of the world through this increased demand and the large prices being paid. When large shipments from Bolivia and Spain began to arrive in the markets prices began to fall and continued steadily to decline during the year 1916, with the result that these speculators suffered heavy losses, and many Chinese mines and works had to discontinue operations.

FARM PRODUCTS ADD TWENTY-ONE BILLION DOLLARS TO WEALTH OF NATION.

Final reports on the 1917 crops were recently issued by the Department of Agriculture showing that with the exception of wheat the leading grains established records in production. The farmers contributed approximately $21,000,000,000 to the wealth of the country. Of this immense total the corn crop leads with an estimated value of $4,053,672,000. The oats crop is valued at $1,061,427,000; wheat at $848,372,000, and potatoes at $543,865,000. Nearly 1,000,000,000 bushels more grain was raised than in 1916.

Samuel Smith, a pioneer plumber of Oakland, Cal., and formerly plumbing and sanitary inspector in that city, died recently after an illness lasting three weeks, in his 71st year. Mr. Smith was a native of Toronto, Canada, and came to California in 1875, and to Oakland in 1878.

RAYMORE & CO., PLUMBING AND HEATING SUPPLIES.

(Continued from Page 447.)

"'Well, you see, I guess its the stimulant I miss,' he said. When I insisted on knowing the name of that stimulant he answered:

"'A fellow can't lay down on his job, when he sees his concern's name all over the sky, as it were.' It struck me all in a heap. It was so like that idea of Napoleon Bonaparte's of pointing out to his men from time to time his star shining over head, always leading them on. Moses Irons and men like him were inspiring their own employees by persistent advertising.

"Another by-product was the good will felt toward Moses by thousands of men in our line, who were not so situated as to buy from him to advantage. They read the advertisements in the trade press—for Moses has never faltered in that—and they read the other advertisements in the national magazines, advertisements which were like bread cast on the waters, for Moses always stuck to the policy of protecting the trade, and they felt a liking, an admiration for a man with that far vision. That had its influence in many ways, most of all in that Moses was simply reaping what he had sowed, while some others of us didn't have sense enough to sow, either the proper seed, the right amount or at the right time.

"Not that he tried to monopolize the advertising mediums for himself; in fact, he was continually urging us to 'go to it' and 'tell the people you are alive!' but some of us were slow, damnably slow at that. So slow that death took us before we knew ourselves to be sick.

"Another so-called by-product was the indirect appeal of Moses Irons' advertisements. That is, the particular fixture featured might not appeal to the master plumber, but the spirit of enterprise which made possible such an extensive campaign, did make its appeal. 'I am going to give that firm of Moses Irons some business. It is up-to-date and surely will do the right thing with us.' So business came from that feeling. Then that of wanting to be in the band wagon, of being hitched to a star, for Moses Irons was an illuminant of the first degree. 'Sure, we handle the Moses Irons line of goods!' that to the public which had gotten the inspiration for its question from reading the advertising columns of the national magazines.

"Also the realization on the part of the trade that the lines featured by the trade and the general press were more than half sold to start with, that contracts were more readily secured in the first place and worked out to better mutual satisfaction between owner, architect and contractor, if such types were used.

"So to Moses Irons and that faithful band, who like him believed in lifting and being lifted at one and the same time, all credit is due. Without their support of the trade press both by advertising in it and by pushing it among customers, why Moses Irons for several years carried three hundred subscribers out of his own pocket, there would not have been the splendid inspiration which now comes to us at such frequent intervals. And without the trade press there would have been no science of sanitation with all the splendid results which that phrase suggests.

"Advertising to the trade, to the public, then in its final analysis under the spectroscope of years, has meant boosting the trade as a whole, every shop engaged in the business, and of boosting the public, for that had to be lifted up to an appreciation of high grade goods at the same time. A 1 fixtures and a far from A 1 public

Trinity
CONCEALED
COMBINATION BATH SUPPLY AND WASTE FIXTURES
GOETZ BRASS COMPANY Manufacturing Specialists
630 N. FRANKLIN ST. CHICAGO, ILLINOIS

Phillips High Speed Drills
For drilling all size holes, ¼ to 1½" in concrete, brick and stone, in walls, floors and ceilings for expansion bolts, pipe hangers, etc. Write for folder. Manufactured by
Daugherty-Smith-Phillips Co., 500 W. Division St., Chicago, Ill.

BACON Pipe Cutting and Threading Machine
not only cuts and threads pipe perfectly, but cuts your labor costs as well. Requires about one-third the time spent on hand work. Can be used either in the shop or on the job. Light, simple, compact, durable.
Write for particulars.
FREMONT MFG.CO. Box 25 Fremont, Mich.

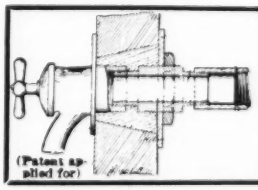
GUARANTEED DURO MADE BY THE BURNETT-LARSH MANUFACTURING CO DAYTON OHIO
THE THREE ESSENTIALS
PRICE—QUALITY—SERVICE
are all combined in
"DURO"
—GUARANTEED—
ELECTRIC HOUSE PUMPS and RESIDENCE WATER SUPPLY SYSTEMS
Send for bulletins and prices

Look for NATIONAL The Name
DO YOU GO AHEAD?
¶ You cannot merely stand still in the march of industrial progress—you must either keep step or drop to the rear.
¶ The man with a tallow candle idea of progress will have no interest in the development of lighting by electricity.
¶ If you are a "live wire" you will be interested in the modern pipe—"NATIONAL" Pipe.
NATIONAL TUBE COMPANY, PITTSBURGH, PA.

No. 2A Thermostat
MFG.CO. ROBERTSHAW YOUNGWOOD, PA
The standard for 30-40 gal. boilers, and single coil heaters or equivalent. Has ⅜-in. gas openings.
We Make All Sizes

Adjustable Vent Caps

Ours Fit Standard or Extra Heavy Soil Pipe
Headquarters for Iron Closet Bends, Boiler Stands, Cesspools, Sink Brackets, Laundry Tub Legs and other IRON Plumbers' Specialties
Wolverine Foundry Co., Detroit, Mich.


(Patent applied for)
THE LILGER LAUNDRY BIBB CONNECTION
is a practical device for laundry tray improvements. Easily attached. Holds bibb in place by nut and washer arrangement. Leak-proof. Saves time and money.
Order from your jobber. Write us for circular.
THE LILGER COMPANY
1246 W. 72nd Place, Chicago, Ill.

An Unsolicited Letter from "YOUR" Friend

Chas. F. Hause Mfg. Co., Inc.,
Omaha, Neb.

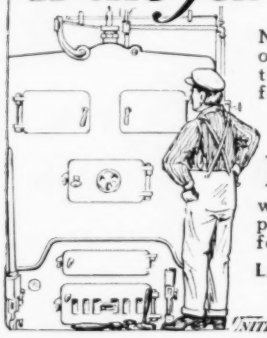
Gentlemen:—After using your "HAUSE" brand of Pipe Joint Cement on high and low pressure steam work and water connections, I wish to express my satisfaction, and recommend its merits for use in such service and advise its trial by all friends of good service. Yours very truly,
J. C. BIXBY & SON CO.
Per J. C. Bixby.

Manufactured in Ready Mixed and Powder Form

Ask your jobber for prices or write direct to

Chas. F. Hause Mfg. Co., Inc. Omaha, Neb.

Is the job complete?



Not until you have cut the oil out of the boiler—not until you have made it ready for steaming economically.

Old Dan Boiler Compound

will cut oil, precipitate dirt, prevent scale. It's a dandy for cleaning boilers.

LANG CHEMICAL CO., DETROIT

Sold by all Branches of

UNITED STATES RADIATOR CORPORATION

Eagle All Lead Roof Flange

LEAD PIPE
Length, 6 inches
Diameter, 4½ inches
Made in Angles, 45 deg., 22½ deg. and Straight.

SIZE OF APRON
15 inches Square

No Caulking To Be Done
Joints Lead-burned—No Solder Used

Flexible Adjustable Economical

Write for Circular and Prices.

Manufactured only by

The Eagle-Picher Lead Co.
CINCINNATI, OHIO

"SEE-VEE" Vapor and Vacuum Specialties Save Fuel

Our Booklet on modulated and Vapor heating is full of instructive matter. It also illustrates and describes our specialties. Send for your copy.

Haynes Selling Company
1711 Sansom St. Philadelphia, Pa.

to buy them would have spelt failure in a very short time.

"It's a better world, a healthier world—why even War has lost its terrible mortality from wounds because of sanitation, and therefore, when we again settle down to peaceful life, a happier world."

* * *

Phil Harton gathered together his papers and rose to go: "Then you intend to keep the advertising going full blast in spite of—"

"Because of it, Phil—because of it. And more advertising rather than less, for there will be some fools who surely will pull in their little stunts and that means a better chance for us. And then we must build for the future. When the present catastrophe is over, there will come the no less bitter fight for world markets. We must be so prepared for that, that there can be no recurrence of this. Our organizations must be speeded up, our young men alert with ambition, all this can only be done by advertising our business to our own employees as well as both to the trade and the public."

As Mr. Harton passed out, the Boss called after him "To-morrow I'll have a schedule ready calling for an increased appropriation."

IN THE DAYS WHEN PLUMBERS POSSESSED ARMORIAL BEARINGS OR COATS OR ARMS.

(Continued from Page 453.)

"What dyseng, cardeng and mummying, what typling, launseng and brasenge of harlots; what garded cotes, jagged hose lined with silks, and cutt shoes! what daggers ys by them worne crosse over thwarte theire backs that theis theire dooings are more cumyle and decent for sagang ruffians than eemlie for honest apprentices."

According to "The Ironmonger," England, there was a curious custom of limiting the number of apprentices in a by-law enacted in 1786 by the Coopers, whose original charter went back to 1426, when each master would take only one apprentice in seven years. By the new rule it was enacted that for the enrollment of every apprentice so taken, a master should pay 10 pounds. Ten years later the Coopers' Company was involved in a law suit and by mandamus, "it was fully determined that corporations have no right to make by-laws in restraint of trade, and that a certain number of apprentices is in restraint of trade, and that a prohibition not to take more is a law in restraint of trade."

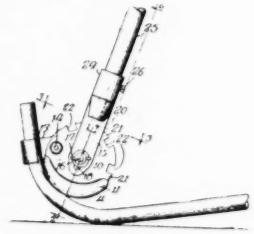
Commenting upon the coat-of-arms or armorial bearings of the Plumbers, Pewterers and Glaziers, which is shown above, "The Ironmonger" of England says: "The coat-of-arms tells its own tale. It is apparent that the plumbers emblazoned on their shield 'two plummets azure,' which seems an appropriate colour for a lead plumb-bob. On the chevron, two soldering irons are in saltire between a cutting knife and a shave hook. The grill-like devices on the pewterers' shield are limbecks, while the knobbly-looking affairs in the base of the glaziers' arms are grazing irons, and the four diamonds are heraldically known as closing nails."

The total capitalization of new corporations amounted to $308,513,700 for October, as compared with $303,70[illegible] for the same month in 1916. Total dividend payments for November show an increase of 7 per cent over last year, amounting to $172,678,663 as compared with $161,955,122. Foreign trade figures reflect the effect of embargoes on exports, the total for October being $456,201,567.

Patents

Heating Department.

1,247,728. Pipe Bender. James F. Scribner, Chicago, Ill., assignor to Universal Headlight Co., Chicago, Ill., a corporation of Illinois. A bench tool characterized by means for holding a pipe whereby the operator may pull directly upon and bend the same, said means including an accurate grooved forming member and a fulcruming member spaced apart and so arranged that the pipe may contact each of said members on substantially opposite sides of the pipe and whereby the pipe is free to be moved longitudinally and axially by the operator at all times so that new surfaces of the pipe will contact said members respectively, as for successive bending operations, said means also including a substantially flat plate adapted to be secured to the bench or the like, said members projecting from one side of said plate, said plate having a substantially Z-shaped slot-like opening, said fulcruming member being adjustably mounted in said opening, the parts of said opening being in such directions that said fulcruming member may be readily positioned nearer to and farther from said forming member and also into various up and down positions relative to the forming member when the plate is in a substantially vertical position.



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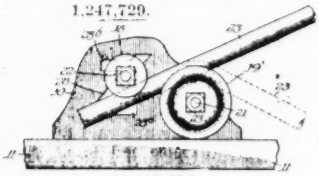

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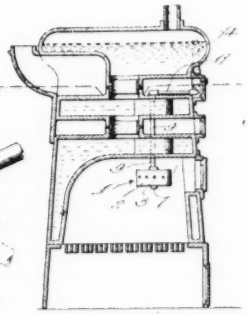


1.247,761.

1,247,729. Bending tool. James F. Scribner, Chicago, Ill., assignor to Universal Headlight Co., Chicago, Ill., a corporation of Illinois. In a pipe bending tool, the combination of a forming member having a curved groove in an edge portion thereof and a plurality of recesses in substantially arcuate bodily arrangement in another edge portion thereof, means for holding a pipe in engagement with said groove, holding means positioned substantially at the center of curvature of the arc of said recesses for holding an operating lever, an operating lever mounted for in and out substantially radial movement and also to rock into various radial positions on said last mentioned holding means, a rigid projection carried by said lever and adapted to engage any of said recesses and thereby lock said lever rigidly to said forming member when the lever is moved radially inward, and means associated with said holding means for releasably mantaining said lever against retraction from its locking relation to forming member.

Use Products

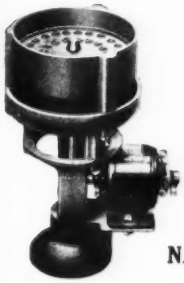
manufactured by

RAYMOND LEAD CO.

735 South Washtenaw Ave.

If Your JOBBER Cannot Supply You With Our Goods, Send Your Orders To Us Direct

Your Customers Want This Novel Device



The NATIONAL Rotary Oil Burner

is adaptable to any boiler, water heater, furnace, kitchen range, etc.

Burns kerosene or fuel oil without soot, smoke or smell. Perfect combustion.

Safer and cheaper than gas.

Write for folders.

NATIONAL ROTARY OIL BURNER CO.
235 Congress St., Boston, Mass.

SOMETHING ENTIRELY NEW IN

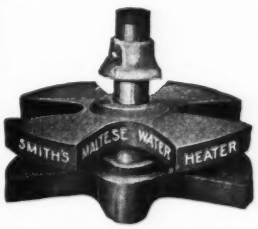
SILL-COCKS

Semi-Finished, Polished aluminum wheel Style N.
Style O—Heavy rough pattern built for service.

STYLE N — Both shown in catalog D — STYLE O

KINSEY & MAHLER CO. *Peoria, Ill.*

Smith's Jointless Hot Water Attachments



are the ONLY ones that give water circular motion and that have no obstruction to the natural movement of the water.

Smith's Maltese Heaters

are made in 8 sizes—can be used in any furnace.

Easy to install. Highly efficient. Thoroughly tested.

Write for Catalog.

Charles Smith Company
Lake and Dearborn Streets **Chicago**

Fig. 608½. House Force Pump.

House Force Pumps

Suitable for use in connection with hydro-pneumatic water systems or for general water supply. "More than a thousand styles and sizes" of

DEMING PUMPS

and complete hydro-pneumatic water systems are shown in our new 360-page pump catalogue. A copy will be sent to any interested plumber on request.

Fig. 516. "Blue Special" House Force Pump.

The Deming Company
Salem, Ohio

GENERAL DISTRIBUTING HOUSES:

Henion & Hubbell, Chicago.
Harris Pump & Supply Co., Pittsburgh.
Ralph B. Carter Co., New York City.
Root, Neal & Co., Buffalo, N. Y.

L. WOLFF MANUFACTURING CO. TRADE MARK. CHICAGO.

Quality Plumbing

L. Wolff Manufacturing Co.

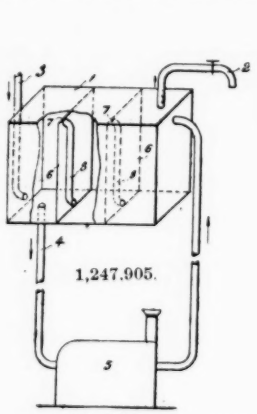
General Offices - 601 West Lake St.
Showrooms - 111 N. Dearborn St.

Chicago

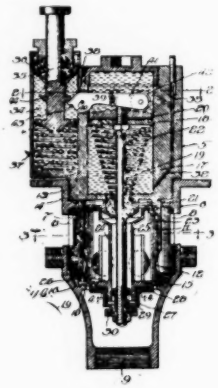
1,247,761. Fuel Saver and Smoke Consumer. Leonidas D. West, Denver, Colo. A smoke consumer and fuel saver comprising a one-piece casing of cylindrical shape with integral ends provided respectively with a central air inlet opening and a central plug-receiving opening, said casing having air discharge perforations, an air retarder in the form of a short length of pipe positioned in said casing coaxially therewith and having one end seated against the casing and surrounding said air inlet opening, and a screw plug threaded in said plug-receiving opening and having in its inner end a concave socket receiving the other end of said retarder to center the latter, said retarder having perforations of less size than those of the casing to cause the slow expulsion of a restricted amount of air from said retarder into the casing.

Plumbing Department.

1,247,905. Hot-Water-Supply Tank. Christiaan Frederik Troost, Armhem, Netherlands. In combination with a hot water tank, a substantially vertical partition extending across said tank, a communicating passage through said partition connecting the upper part of one portion of the tank directly to the lower part of the other portion, cold water inlet entering the first mentioned portion of the tank at the lower part thereof, and a hot water outlet leaving the second mentioned portion of the tank at the upper part thereof.



1,247,905.

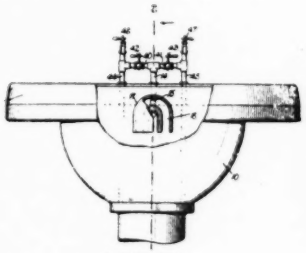


1,248,331.

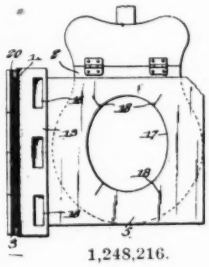
1,248,331. Flushing Valve. Joseph Husa, Chicago, Ill. In a device of the class described, the combination of a cylindrical oil chamber, a plunger working therein, a piston operatively connected to said plunger and extending through the wall of the chamber, a helical spring within the chamber tending to raise the plunger, there being an oil passage connecting together the portions of the chamber above and below the plunger, a needle valve controlling the flow of oil through said passage, a lever above the plunger and pivoted to a stationary part, a roller on one end of the lever engaging the upper face of the plunger, a vertically movable pin adjacent to the lever, a finger on the lever, a cam projection on the pin adapted to engage said pin when the pin is raised for the purpose of tilting the lever to thereby depress the plunger, a spring tending to raise the pin, and suitable valve mechanism connected to the piston rod, substantially as described.

1,248,076. Lavatory. Michael J. Carroll, Elizabeth, N. J. A lavatory comprising a bowl having a lateral inlet near the top thereof and a lateral overflow outlet immediately below the inlet, and an inverted U-shaped delivery channel disposed in a plane parallel with a side of the bowl, and having its upper portion in communication at a middle point with the said inlet, and having its legs extending downwardly on opposite sides of the overflow

outlet to provide an overflow channel which is closed at its outer side, the lower ends of the overflow channel and the legs of the delivery channel being in substantially the same horizontal plane.



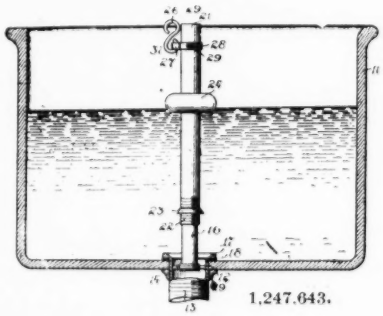
1,248,076.



1,248,216.

1,248,216. Sanitary Toilet Seat. Leo B. Ward, San Francisco, Cal. A toilet paper container comprising a slotted paper receiving receptacle, means for mounting a roll of paper to revolve therein, a guide mounted upon the outside of said receptacle, said guide comprising spaced parallel walls defining a passage open at each end, one end of said passage being located adjacent the slot in the receptacle, and a tensioning spring located within said passage in a manner to engage the side edges of the paper only for the purpose of tensioning the same.

1,247,643. Float Valve. Frederick J. Clifford, Chicago, Ill., assignor to Alliance Company, Chicago, Ill., a corporation of New Jersey. In a valve mechanism for a closet tank and the like a valve seat, consisting of inner and outer members forming an annular passage therebetween, a stationary guide disposed through the inner



1,247,643.

of said members, an annular valve disposed about said guide and engaging said seats in closed position, and means slidable with respect to said stationary guide for lifting said inner seat to relieve the valve from pressure of water in the tank and permit it to ride to floating position by its own buoyancy.

CONVENTION DATES.

January 15, 16 and 17, 1918.—The annual convention of the Iowa State Association of Master Plumbers, at Waterloo, Iowa.

January 22, 23 and 24, 1918.—The twenty-sixth annual convention of the Illinois Master Plumbers' Association, in the Sweeting Building, Bloomington, Ill.

February 5, 6 and 7, 1918.—The annual convention of the Ohio State Association of Master Plumbers, at Dayton, Ohio.

Grand Rapids, Mich.—Adolph Leitelt Iron Works has been awarded the contract for the installation of a heating system in the Roger Mara garage.

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Is only one of the 20 Superior

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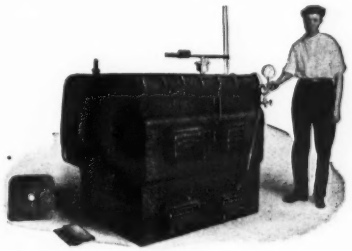

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"Compacto" Automatic Seat Action Tank Valve

unequaled

Arrow No. 1 shows point where tee-shaped member engages lever when seat is occupied.

When seat pressure is released, this falls back, pressing lever downward, which raises valve stem into position, as shown by Arrow No. 2.

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WANTED — SALESMAN, PLUMBING and heating trade, Philadelphia and vicinity. State experience. All replies strictly confidential. Address, Froelich Bros., Inc., 142 N. 7th St., Philadelphia, Pa. 12-15

WANTED — SALESMAN TO COVER New England and New York States, and possibly the adjoining states, who has had at least three years' experience in selling and handling steam specialties. Send application with references and experience to P. O. Box 1012, New Britain, Conn. 12-15; 22

WANTED—EXPERIENCED SALESMAN for plumbing and heating supply business. One familiar with trade in Central and Northern Iowa, Southern Minnesota and Western Wisconsin preferred. Address 2478, care "Domestic Engineering," Chicago. 12-8; 15

WANTED—EXPERIENCED SALESMAN to sell a line of high grade plumbers' brass goods as well as a line of valves for steam. Furnish references and state age and if married or single. Address 2480, care "Domestic Engineering," Chicago. 12-8; 15

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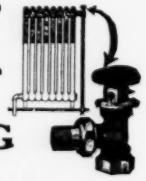

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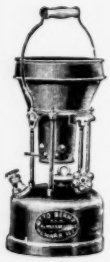

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